Moorebank Logistics Park West Precinct

Basin 6

Autumn Stormwater Network Water Quality Monitoring Data & Reporting April 2025

Site image: retention basin 6 MPW (Apical image April 2025)

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Consulted Documents / database.

Australia and New Zealand Guidelines for fresh and Marine Water Quality (2000)
NATIONAL WATER QUALITY MANAGEMENT STRATEGY - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) - Volume 2 - Aquatic ecosystems

Bureau of Meteorology – Australian Government Australia's official weather forecasts & weather radar - Bureau of Meteorology (bom.gov.au)

Moorebank Intermodal Precinct West – Stage 3 (SSD 10431) | Assessment Report March 2021
https://moorebankintermodalprecinct.com.au/wp-content/uploads/2023/04/MPW-S3-DPIE-assessment-report-to-IPC.pdf

WQM Report Western Precinct _Basin 6_Autumn 2024 – Apical Bushfire and Planning - April 2024

WQM Report Western Precinct _Basin 8_Spring 2024 – Apical Bushfire and Planning - October 2024

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 7709 Applicant: Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings Limited Consent Authority: The Independent Planning Commission Site: Moorebank Avenue, Moorebank Lot 1 DP 1197707 Lot 100 DP 1049508 Lot 101 DP 1049508 Lot 2 DP 1197707 Part Lot 3 DP 1197707 Part Anzac Road and Moorebank Avenue public road reserves Development: Moorebank Precinct West Stage 2 (MPW Stage 2)

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 10431 Applicant: Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings Limited Consent Authority: The Independent Planning Commission Site: Moorebank Avenue, Moorebank Lot 1 DP 1197707 Lot 100 DP 1049508 Lot 101 DP 1049508 Moorebank Precinct West Stage 3 (MPW Stage 3)

Australian Laboratory Services (ALS) Work Order EW2402561 Certificate of Analysis Water Sample Data 09th April 2025.

Liverpool DCPLiverpool's Development Control Plans | Liverpool City Council (nsw.gov.au)

DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.

https://environment.gov.au/system/files/pages/dfb876c5-581e-48b7-868c-242fe69dad68/files/draft-environmental-mgt-guidance-pfos-pfoa.pdf

Development Consent SSD 7709 - Section 4.38 of the Environmental Planning and Assessment Act 1979

https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2019/05/moorebank-intermodal-precinct-west-stage-2/referral-from-department-of-planning-and-environment/revised-recommended-conditions/mpw-stage-2-recommended-conditions-inclusive-of-edits-191105.pdf

Glossary

The following definitions apply to terms used in this report. Many of these definitions are consistent with relevant national literature and cited where appropriate.

Current status trigger value
Concentrations of water quality indicators that reflect existing ecosystem condition, and therefore provide a target for ecosystem maintenance and a benchmark against which future water quality trends may be monitored.

Environmental value
Particular values or uses of the environment important for a healthy ecosystem or for public benefit, welfare, safety or health and requiring protection from the effects of pollution or degradation (Environment Australia 2002).

Indicator
A parameter (biological, physical or chemical) used to provide a measure of the quality of water or the condition of an ecosystem (Environment Australia 2002).

Low-risk trigger value
Concentrations (or loads) of key performance indicators [of water quality] at which if not exceeded, there is a low risk that adverse biological effects will occur (ANZECC 2000a).

Median
The middle reading, or 50th percentile, of all readings taken. i.e. of the readings 10, 13, 9, 16 and 11 (re-ordering these to read 9, 10, 11, 13 and 16), the median is 11. The mean (or average), is the sum of all values divided by the total number of readings (which in this case equals 11.8).

Reference condition
Refers to a site which is unmodified or minimally modified from 'natural' condition. Most commonly, reference sites are subject to limited disturbance from human activity. The reference condition then serves as a standard or target against which environmental change in other similar sites can be assessed.

Trigger value
A concentration that, if exceeded, would indicate a potential environmental problem, and so 'trigger' a management response, such as further investigation and/or remedial actions (ANZECC 2000a).

Water quality guideline
A numerical concentration level (e.g. of a contaminant) or narrative statement (e.g. visual appearance of a water body) recommended to support and maintain a designated water use (ANZECC 2000a)

1.1 Background

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 3 (the Project) of Moorebank Precinct West (MPW), which comprises the third stage of development within the Moorebank Precinct West under Development Approval SSD-10431.

The proposal is SSD under clause 19 of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011, as it is development for the purpose of rail and related transport facilities.

The MPW site is located on the western side of Moorebank Avenue and forms the western section of the Moorebank Intermodal Precinct (Figure 2). The MPW site is approximately 2.5 kilometres (km) from the Liverpool city centre, 27 km south-west of the Sydney Central Business District (CBD) and 26 km west of Port Botany.

The MPW site is irregular in shape, approximately 3 km from north to south and 960 m from east to west at its widest point and covers an area of approximately 220 ha. It is situated between the Georges River to the west (with the SSFL running north-south to the west of the river); and Moorebank Avenue to the east.

Works on the MPW site to date have commenced under two current and active development consents:

• MPW Stage 1 early works, which provides demolition, rehabilitation, remediation of contaminated land, and the establishment of construction facilities and access including site security (as part of the SSD 5066 consent)

• MPW Stage 2, which provides for the construction and 24/7 operation of an intermodal facility and associated warehousing (SSD 7709).

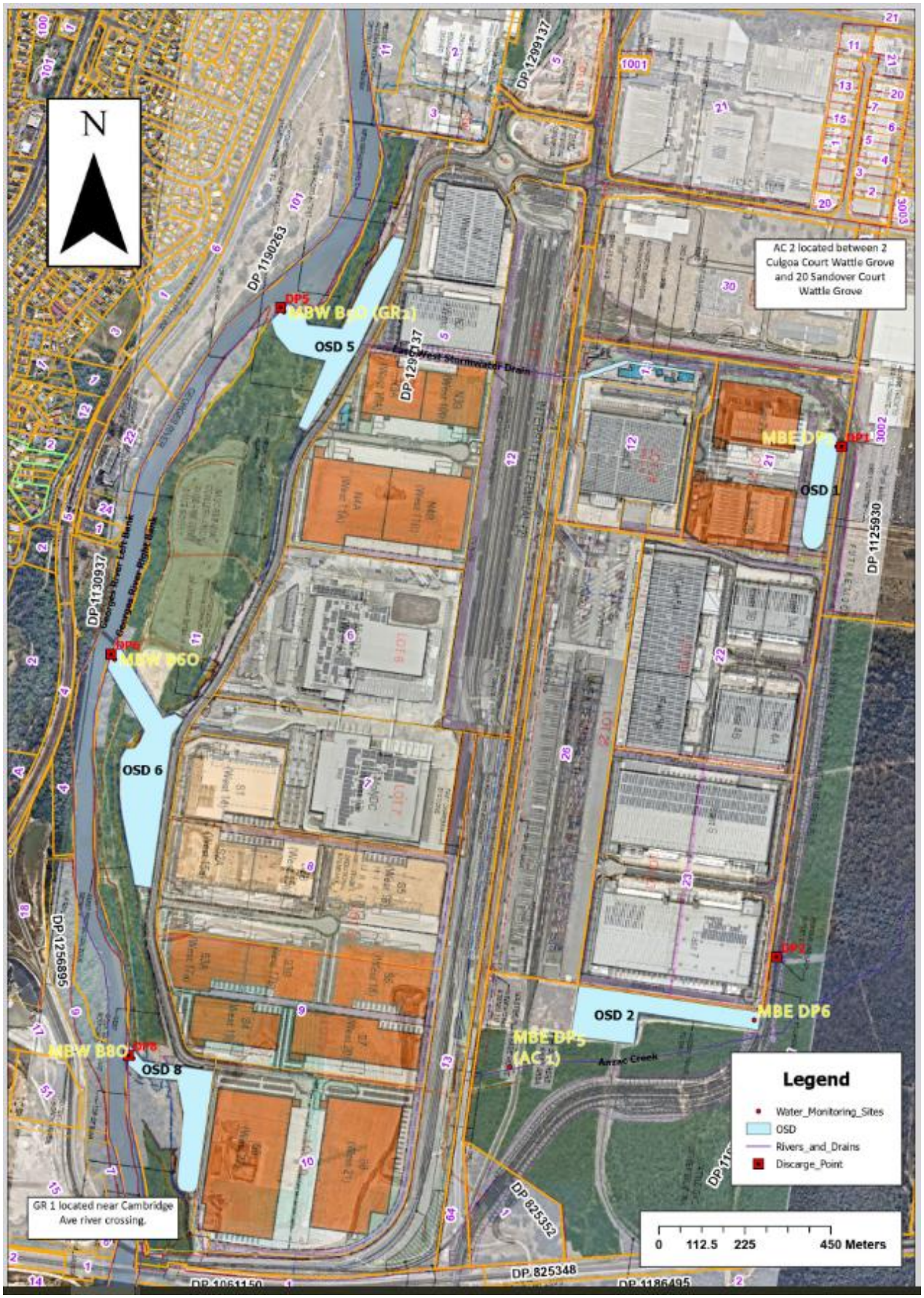
Across the entire precinct there are six onsite detention basins. Bioretention/biofiltration systems also make up the stormwater management infrastructure within the site.

This water quality monitoring program is guided by the Stormwater Infrastructure Operation and Maintenance Plan (SIOPM) and is provided to Qube Holdings Limited (the Applicant) on behalf of MID Plumbing. Three onsite bio-retention basins are present within Moorebank Precinct West. This report is in reference to Basin 6 (MPW – west).

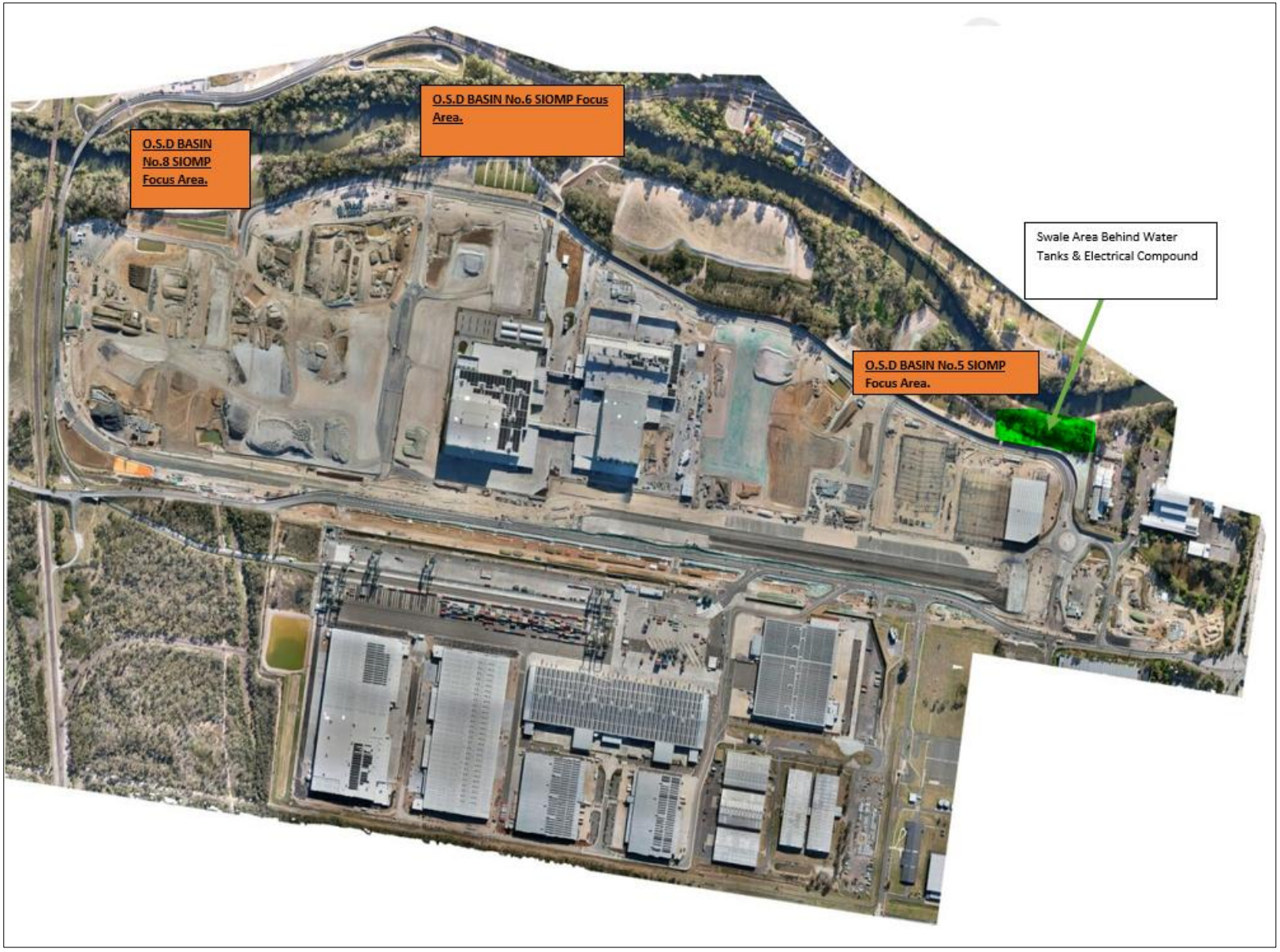
Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 7709 Moorebank Precinct West Stage 2 (MPW Stage 2)

CoC	Requirement
Stormwater Quality Monitoring	
B38.	Stormwater Quality Monitoring Program - Prior to commencement of operation Part of the Operational Environmental Management Plan

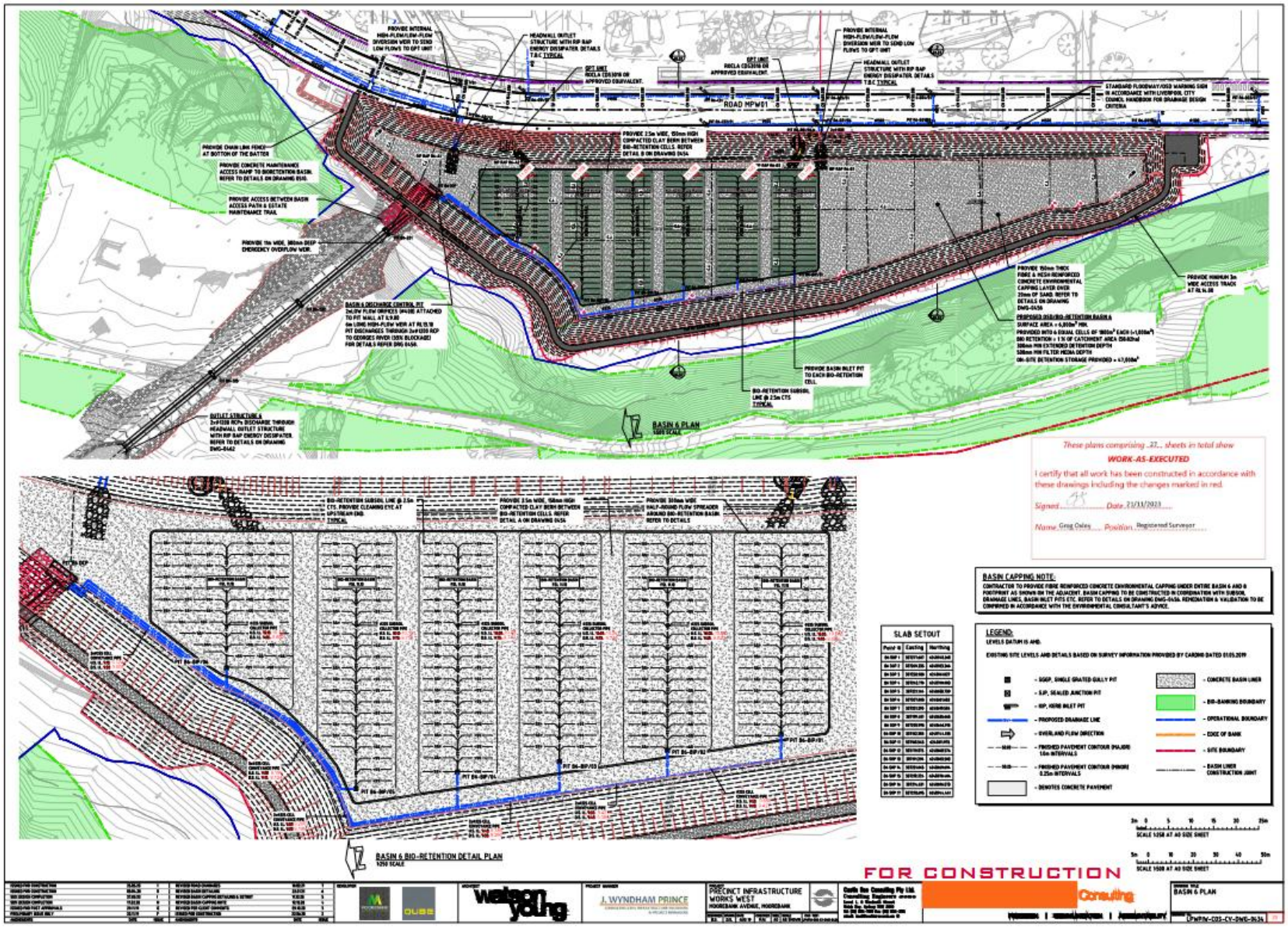
Map image 1. Overview subject site (MPW) provided by Arcadis



Map Image 2. Moorebank Precinct West Detention Basins (provided by MID Plumbing)

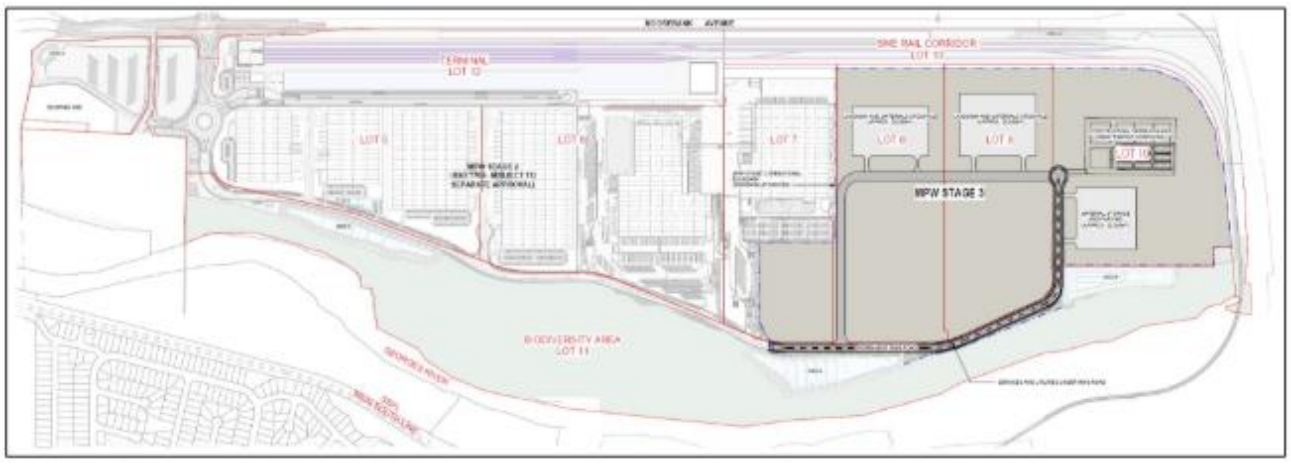


Map image 3. Detention Basin 6 MPW (west)



1.2 Reference information

Map image 4. Moorebank Intermodal Precinct West – Stage 3 State Significant Development Assessment (SSD-10431) March 2021



20. Stormwater Management System or Works	That untreated stormwater is not disposed of into the Georges River or its tributaries. The likely impact of stormwater disposal on the quality of any receiving waters. That the levels of nutrients and sediments entering the waterway are not increased by the proposed development. Whether any proposals to manage stormwater are in accordance with the local council's stormwater management plans and the Managing Urban Stormwater series of documents and meet the local council's stormwater management objectives. Whether the principles outlined in the *Managing Urban Stormwater Soils and Construction Handbook* (1998) prepared by and available from Landcom and the Department of Housing are followed during each stage of a development (including subdivision).	Detailed stormwater assessments were undertaken as part of MPW Stage 2, and remain applicable to the Stage 3 proposal. The Department has recommended conditions that would enforce these requirements, by ensuring that appropriate measures are implemented to manage stormwater impacts during construction. In regard to management of stormwater during operation of the MPW site, the MPW Stage 2 proposal incorporates a robust set of conditions to manage the release of stormwater via six onsite detention basins (OSD), a major east-west covered culvert and associated drainage infrastructure.

2. Monitoring Program Methodology

2.1 Monitoring Sites

To support stormwater and drainage management of the facility the MLP West precinct has established a vast stormwater infrastructure system consisting of several Water Sensitive Urban Design (WSUD) functions including raingardens detention basins and bio-swales. These networks are designed to minimise the velocity and peak discharge of stormwater draining from the site and act as onsite detention basins to harvest and sequester potential pollutants generated at the site through designed biological processes.

The stormwater infrastructure system discharges water into the natural drainage system via three outlets:

- Basin 5 detains water from the northern section of MPW before discharging into Georges River
- Basin 6 detains water from the mid-section of MPW before discharging into Georges River
- Basin 8 detains water from the southern section of MPW before discharging into Georges River

Monitoring of the discharge points has been established via our ongoing program with MID Plumbing under the SIOMP program to collect qualitative data and analyse the performance of the WSUD provisions and to establish any potential trends in water quality readings from the stormwater network discharge points prior to release of water into the natural hydrological systems of Anzac Creek and the Georges River.

Table 1. Type of outlet MPW

Discharge Point (see figure 2)	Associated Outlet (see figure 1)	Type of outlet/detention basin
Basin 5	Inlet	Bio retention
	Outlet	Outlet point
	Georges River	River
Basin 6	Inlet	Bio retention
	Outlet	Outlet point
Basin 8	Inlet	Bio retention
	Outlet	Outlet structure

2.2 Water Quality Assessment

Surface water quality data collected at the discharge points is assessed with reference to ANZECC Guidelines (2000) and correlated with baseline Water Quality monitoring results provided by previous condition assessment reports.

By comparing water test data under the program across the testing timeline we can identify and report upon trends, identify exceedances and exclude potential anomalies for datasets.

ANZECC Low Risk Trigger Values

Ecosystem type	Turbidity NTU	EC µS/cm	pH*	DO	TN mg/L	NO_x - N mg/L	NH_4^+ - N mg/L	TP mg/L	DRP - P mg/L
Upland river	2-25	30-350	6.5-7.5	90-110	0.480	0.190	0.013	0.013	0.005
Lowland river	6-50	125-2200	6.5-8.0	85-110	0.500	0.190	0.020	0.050	0.020

Values for Low Land River Systems as insert above are used as the reference guide to water quality parameter values and overall health and safety statements regarding the quality of discharged water from the SIOMP drainage network.

Annual spring and autumn water quality data presented from Anzac Creek and Georges River testing programs by other scientific consultants may also be cross referenced to the data prepared by Apical under the SIOMP program to establish potential trends in results and identify increases in accumulated pollutants from the site under operational condition, which may appear present within adjacent natural waterways.

Site data was collected in the form of water samples and in field data recordings at the prescribed monitoring points, water samples and water probe readings are undertaken following Australia and New Zealand guidelines for fresh and marine water quality – 2000 (ANZECC Guidelines), In situ water quality parameters relevant to stream health and aquatic assessment profiling were collected in field with a multiparameter hand-held water quality monitoring probe (Aquatroll 600).

Water data is collected, analysed and collated under the same methodologies and process under each testing period, the ensure consistency in the process.

Measures tested and samples taken:

- pH
- Dissolved Oxygen
- Electrical Conductivity
- Water Temperature and
- Turbidity

Water samples are collected at inlet and discharge points (Basin 5, Basin 6 & Basin 8) then sent to Australian Laboratory Services (ALS) for quality testing analysis Surface water (alsglobal.com).

Water analytical suites / testing parameters are provided to obtain overall water condition results and chemical sampling of collected water is undertaken for a range of nutrients, metals, and hydrocarbons relevant to stream health and aquatic assessment protocol, key nutrients, metals, and pollutants included in the assessment to reflect an overall suite of water quality condition guides which are listed below:

- Total phosphorous
- Total Nitrogen
- Kjeldahl Nitrogen
- Dissolved Metals
- PFAS
- Total Suspended Solids
- Total Hydrocarbons

The raw data results from the lab analysis provided to us by ALS Laboratory Services are presented within this report (see Appendix A).

Key water quality data attributes are recorded, tables and compared against; previous condition baseline data, Spring 2025 data, Liverpool Development Control Plan (DCP) water quality targets, Conditions of Consent B40 and ANZECC Guideline (2000) trigger limits under the condition category -(90% protection criteria for freshwater natural systems). The water quality guidelines are applied to ensure adjacent natural waterways George River and Anzac creek are not adversely affected by poor water quality discharge from the Moorebank logistics park site and operations.

Trends observed in our datasets are analysed on a temporal scale with any trigger values for specific water quality measures highlighted and presented within the results chapter of each seasonal report.

2.3 Data Analysis

The water quality measurements collected are used to assess water quality at each site in terms of health of aquatic ecosystems by comparison with guideline values recommended by the ANZECC and ARMCANZ (2000) guidelines for the protection of lowland streams (i.e. systems at < 150 m altitude) in south-east Australia. This categorisation for stream health is deemed relevant for the description of Anzac Creek, the recipient natural way due to the location in the geomorphic landscape and correlations of expected biophysical health and habitat profiles for similar stream environments.

2.4 Survey dates and personnel

On April 09th 2025, ecologists from Apical Bushfire and Planning attended Moorebank Precinct West (MPW) to collect water quality data across the testing sites which are located within selected inlet points and discharge points within the stormwater drainage and management system (SIOMP) located within the Moorebank Logistics Park site West (See map image 2.).

Inlet and outlet points within the network are representative of variant sites where stormwater will enter a node of the system (as a point source) and then release from the that node of the system at a discharge point. By recording inlet and discharge data water quality can be tracked along the continuum within the system to determine condition changes and overall trends in measured quality at given sites.

This data was collected on behalf of MID plumbing in accordance with 'The Stormwater Infrastructure Operation and Maintenance Plan Moorebank Logistics Park – West Precinct 2020' and in compliance with Condition of Consent B40 (Liverpool City) for the subject site. The results of such monitoring data collection are presented within this report.

2.5 Rainfall

Between the 1st of March and the 31st of March 2025 Moorebank received 90.2mm of rainfall (http://www.bom.gov.au/climate/dwo/202409/html/IDCJDW2161.202409.shtml). Between the 1st of April and the 15h of April 2025 Moorebank received 3.4mm of rainfall.

Figure 1. Bureau of Meteorology Daily Weather Observation Holsworthy March 2025

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Sa	18.7	32.0	0			S	28	23:13	22.9	78		WSW	13	1016.7	31.2	53		ENE	15	1012.3
2	Su	19.8	25.7	0			S	52	16:16	23.5	85	8	SSE	19	1013.7	24.8	75	8	SE	30	1013.1
3	Mo	19.2	25.6	0			S	37	08:09	22.2	71	3	S	22	1018.7	24.3	63	8	S	22	1017.6
4	Tu	18.5	26.0	6.8			S	46	15:00	21.0	94	8	SE	9	1021.3	24.2	70	8	SSE	26	1021.6
5	We	18.5	26.7	3.2			SE	35	15:06	22.3	74		SSE	15	1021.8	25.3	55	6	SE	22	1019.5
6	Th	16.9	26.9	0			SSE	43	15:50	21.9	81	8	SSE	15	1020.4	25.4	62	7	SE	22	1019.9
7	Fr	17.9	26.5	2.4			ESE	44	12:59	19.9	92	8	SSE	15	1021.6	25.6	55	5	ESE	24	1020.5
8	Sa	17.4	24.5	2.6			SE	33	12:14	21.1	87	7	SSE	17	1022.8	23.2	70	8	ENE	15	1022.5
9	Su	19.8	28.5	1.4						21.8	94	8		Calm	1023.7	27.0	55	2	ENE	19	1020.7
10	Mo	18.5	27.1				NNE	24	13:12	22.9	79	8	NNE	7	1020.8	26.1	60	8	NNE	13	1018.6
11	Tu	19.4	22.3	9.0			SE	30	06:14	20.2	97	7	SSE	15	1020.5	21.4	93	8	ESE	17	1020.6
12	We	18.6	27.0	8.0			SE	22	13:50	20.4	94	6	W	9	1022.8	26.8	63	8	ENE	7	1019.8
13	Th	17.0	31.7	0			N	24	10:29	19.8	97	7	W	7	1020.1	30.5	48		NNW	9	1016.8
14	Fr	17.8	35.8	0			SSE	30	22:56	23.1	90			Calm	1019.5	34.3	36		NE	9	1016.3
15	Sa	22.0	34.7	0			SE	30	23:09	23.6	85	8	W	7	1019.9	34.5	45		NE	11	1014.5
16	Su	21.0	37.0	0			W	39	12:21	25.6	67		W	6	1011.6	36.4	26		WNW	20	1006.7
17	Mo	15.5	21.5	0			SSE	61	01:54	18.0	51		SSW	20	1018.9	20.5	39		SE	28	1020.8
18	Tu	10.9	24.4	0			E	28	10:42	16.0	71			Calm	1024.5	23.1	51	8	ESE	17	1022.4
19	We	15.6	28.6	0			E	31	14:05	19.3	80	1		Calm	1023.3	27.3	54		ESE	20	1019.0
20	Th	18.2	32.5	0			ENE	31	17:41	22.1	81	1		Calm	1020.3	31.3	47		E	17	1015.6
21	Fr	17.9	27.5	0			SSE	31	18:36	20.1	90	8	W	7	1014.5	25.9	68	3	N	13	1012.5
22	Sa	18.9	26.7	1.4			SE	31	16:27	19.8	87	7	W	6	1017.6	25.1	63	8	SE	17	1015.9
23	Su	19.7	22.1	4.0			S	26	12:46	20.4	92	8	S	13	1021.1	21.0	88	8	S	15	1019.8
24	Mo	18.8	25.8	3.6						20.3	97	8	S	2	1020.3	24.2	71	7	ESE	9	1018.9
25	Tu	19.6	26.2				SSE	31	12:01	22.6	82	4	S	13	1023.1	23.4	82	8	SSW	11	1021.2
26	We	18.4	27.5	1.0			E	33	16:13	19.8	97	1		Calm	1022.6	26.8	54		E	17	1020.5
27	Th	15.6	25.7	0			S	28	10:22	18.4	94	1		Calm	1023.4	24.6	74	8	SE	17	1022.1
28	Fr	16.7	24.2	1.4			E	30	13:28	19.9	96	8		Calm	1022.6	23.8	74	8	E	15	1019.7
29	Sa	18.0	22.0	19.0			SW	37	21:32	18.6	96	7	SSW	7	1012.6	20.0	95	7	WSW	11	1007.3
30	Su	18.4	24.2	11.8			S	50	14:42	19.4	91	8	WSW	13	1008.1	22.1	79	8	SSW	31	1008.1
31	Mo	17.4	24.3	14.6			SW	54	13:19	19.5	79	6	SW	17	1011.7	22.6	64	8	SSW	26	1011.7
Statistics for March 2025																					
Mean		18.1	27.1							20.9	85	6		8	1019.4	25.9	62	7		17	1017.3
Lowest		10.9	21.5	0						16.0	51	1		Calm	1008.1	20.0	26	2	ENE	7	1006.7
Highest		22.0	37.0	19.0			SSE	61		25.6	97	8	S	22	1024.5	36.4	95	8	SSW	31	1022.5
Total				90.2																	

IDCJDW2161.202503 Prepared at 13:00 UTC on Monday 14 April 2025

Figure 2. Bureau of Meteorology Daily Weather Observation Holsworthy April 2025

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Tu	15.6	23.2	0			S	37	10:56	19.2	73	5	WSW	9	1015.2	22.1	55	5	SSW	20	1013.3
2	We	13.0	24.6	0			E	28	16:07	14.3	82	7	WSW	9	1012.4	23.9	41		NE	11	1007.8
3	Th	10.1	26.7	0			WNW	39	11:44	14.1	94			Calm	1011.3	25.9	26		SW	9	1009.7
4	Fr	12.3	25.3	0			SE	31	15:50	16.9	86		WSW	7	1016.4	24.6	58	3	SE	15	1014.4
5	Sa	14.3	26.2	0			SE	39	16:24	18.5	47		WNW	9	1015.0	25.0	31		SE	19	1013.9
6	Su	9.2	25.3	0			W	26	11:47	17.1	75		NW	9	1018.8	23.6	31	8	S	6	1013.9
7	Mo	11.5	26.9	0			WSW	43	12:01	19.8	50		NW	11	1018.1	26.7	27		W	11	1015.9
8	Tu	12.3	22.2	0			SE	28	15:34	18.0	71	7	W	9	1025.2	21.4	60	8	SE	19	1023.1
9	We	15.5	24.0	1.2			E	28	13:17	19.7	80	5	ENE	7	1025.7	22.1	69	1	ENE	19	1021.4
10	Th	12.4	24.2	0			NNE	17	14:07	17.7	89	8		Calm	1023.2	23.7	59	8	ENE	7	1020.0
11	Fr	12.4	30.1	0			SE	37	14:37	20.0	76		WNW	9	1023.9	26.7	48	2	SE	20	1022.8
12	Sa	15.1	26.4	0			SSE	28	13:10	21.7	74		WNW	6	1030.8	24.9	64	1	E	17	1028.9
13	Su	13.2	26.8	0			ENE	28	16:05	20.5	85		W	7	1030.2	25.5	51		ENE	17	1025.9
14	Mo	12.4	28.8	0			S	57	14:47	18.8	86		WSW	9	1025.6	24.4	61		S	26	1023.6
15	Tu	16.2		2.2						19.4	75	8	SSW	15	1027.7	19.3	72	8	SSE	19	1025.5
Statistics for the first 15 days of April 2025																					
Mean		13.0	25.8							18.4	76	6		7	1021.3	24.0	50	4		15	1018.7
Lowest		9.2	22.2	0						14.1	47	5		Calm	1011.3	19.3	26	1	S	6	1007.8
Highest		16.2	30.1	2.2			S	57		21.7	94	8	SSW	15	1030.8	26.7	72	8	S	26	1028.9
Total				3.4																	

IDCJDW2161.202504 Prepared at 05:36 UTC on Tuesday 15 April 2025

3. Results

Data results captured by our water quality sampling are presented herein and are compared with baseline & Spring 2025 water quality results for Moorebank Precinct West Basin 6. Threshold guideline quantitative values for the water quality parameter themes are compared and correlated to ANZECC/ARMCANZ (2000) guidelines under the categorisation thresholds – Waterway benchmark group: 'The protection of slightly disturbed lowland river ecosystems in southeast Australia'.

Triggers Exceedances from both the In-Situ Data and the Laboratory Samples April 2025

Location Basin 6 Outflow

Phosphorous 30 µg/L (Guideline trigger 25 µg/L)

Nitrogen 600 µg/L (Guideline trigger 350)

Copper 0.002 µg/L (Guideline trigger 0.0014mg/L)

Literature Review

Phosphorous Values

Phosphorus

Stormwater runoff is a major cause of physical, chemical (i.e. nutrients), and microbial degradation of receiving waters. Nitrogen (N) and phosphorus (P) are of particular concern and interest in urban stormwater runoff due to their role in eutrophication of water bodies, onset of harmful algal blooms, and fish kills. refer (Yun-Ya Yang & Gurpal S. Toor)

The linkages between urbanization and increased N and P export is well established; however, the contributions and dynamics of N and P are often site-specific, the synchronicity between N and P in aquatic environment has been widely used as an ecological indicator of biological growth and nutrient limitation.

Understanding P dynamics in stormwater runoff can help to implement and enhance the effectiveness of strategies to control P loss and transport to receiving waters.

P values from this testing period were slightly raised above the ANZECC guidelines, however are considered reasonable for the testing environment and sample pool.

Nitrogen Values

Nitrogen

A previous spike in Nitrogen has decreased to almost meet the ANZECC trigger value for rivers flowing to the coast at this collection point. This may be due to increased vegetation within the system allowing for uptake of excess nitrogen being mobilised by the stormwater.

Nitrogen values are above the guideline rates, however this is a reduction in concentration when compared to the samples of October 2024, which provides an improvement in nitrogen concentration.

Five (5) Industrial Applications of Nitrogen

While the main industrial use of nitrogen is to create ammonia that is required for fertilizer, explosives, and other materials, it uses go far beyond these applications. From food packaging to pharmaceuticals, nitrogen gas can be found in more places and used for more purposes than you may have realized.

Food Packaging: It is common practice for food processing companies to use compressed nitrogen to displace oxygen in the packaging of perishable foods. Without oxygen, the shelf life of foods such as meats, fruits, vegetables, and various snack foods can be extended. Nitrogen can also add a cushion around food to keep it safe during transport.

Chemical Blanketing: Nitrogen is typically used to prevent fires and explosions in dangerous atmospheres like chemical

plants or manufacturing facilities, by lowering the oxygen level below explosive limits.

Electronics: In the process of assembling electronics, nitrogen gas is used when two electronic components are forming a permanent connection, also known as soldering. The gas is used to reduce surface tension so there is a cleaner break away from the site of the electrical bond. Nitrogen gas is also used in a computer's main processing system to prevent it from overheating.

Laboratory: Laboratories require a very specific environment to ensure that tests and results are carried out accurately. Nitrogen gas is used to control oxygen levels, humidity and temperature, and maintain an appropriate atmosphere for highly sensitive procedures and equipment. Additionally, there are various pieces of laboratory equipment that require nitrogen for purging.

Laser Cutting: The application of nitrogen as a purging gas in the steel industry is extremely important. It is used as an assist gas to blow away molten material and achieve a stronger stainless or aluminized steel product that is also more resistant to corrosion.

https://nigen.com/industries-that-benefit-from-on-site-nitrogen-systems/

Industries That Benefit from On-Site Nitrogen Systems

Gaseous nitrogen is very useful in large-scale manufacturing and industrial applications. The large volumes of nitrogen gas required for these operations are either sourced from vendors in gas cylinders or generated on-site. In this article, we will highlight critical industrial processes that benefit from on-site nitrogen systems.

Elevation pH values recorded from location Discharge point 6

Copper Concentration Values

It is well-established that even low concentrations of dissolved copper can be toxic to many aquatic organisms. It is important to understand the variables controlling dissolved copper concentrations in point source stormwater runoff as a means of identifying characteristics of the most problematic sites and designing appropriate treatment strategies.
Studies of copper concentrations in stormwater have also derived that Increased dissolved copper concentrations can be highly correlated with both dissolved organic carbon (DOC) and alkalinity; refer(Jeffrey A. Nason jeff.nason@oregonstate.edu, Don J. Bloomquist, and Matthew S. Sprick). The strong positive relationship between DOC and copper has been observed in other systems (Martinez and McBride, 1999, Romkens and Dolfing, 1998) and highlights the ability of NOM to increase [Cu]d through complexation.

The sources of copper in stormwater runoff include engine oil, combustion of lubricating oils, roof/gutter runoff, building siding corrosion, fertilizers, pesticides, industrial releases, and wet and dry deposition (Davis, et al., 2001, Kim and Fergusson, 1994, Makepeace, et al., 1995, Rosselot, 2006b). However, the biggest single source of copper to stormwater runoff is use of heavy vehicles and contaminants such as brake pad dust and exhaust particles (Legret and Pagotto, 1999, Rosselot, 2006a).

Recent rainfall totals for the catchment area prior to the testing regimes may also impose a large factor bearing on the results for copper concentration values; Total rainfall volume, rainfall duration, and rainfall intensity have been correlated to decreased copper levels, likely due to dilution (Driscoll, et al., 1990, Kayhanian, et al., 2003). Factors likely to influence the presence of copper in runoff samples include AADT, urban site classification, ADP, the "first flush effect", total rainfall, and rainfall intensity.

Results of our assessment may confirm other findings that urban (high traffic) catchment areas show the most potential for producing runoff that would expose aquatic species to elevated levels of [Cu]d (copper), increasing the possibility of copper toxicity. Additionally, first-flush samples displayed consistently higher [Cu]d than samples collected at later times during a storm. Therefore, best management practices (BMPs) aiming to ameliorate the effect of copper should focus on high traffic, urban areas, the first flush of storms, and point discharges to receiving waters.

3.2 Interpreting Results

Dissolved Oxygen – Measures:

Dissolved oxygen (DO) is oxygen held (dissolved) in the water and available to aquatic organisms.

The amount of dissolved oxygen in a river or stream can tell us a lot about its water quality.

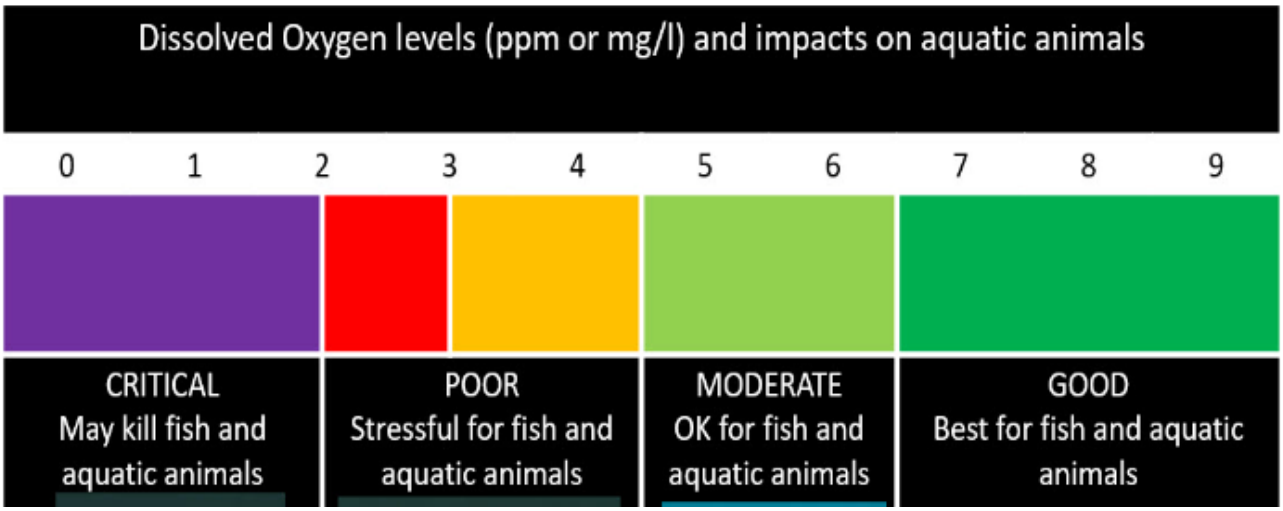
Water will naturally contain a certain amount of dissolved oxygen that is absorbed from the air and produced by plants and algae living in the water.

Temperature has a large effect on the amount of oxygen dissolved in water; cold water can hold higher levels of oxygen than warmer water. Higher water temperatures over summer will cause oxygen levels to drop.

Other factors such as river flow, wind, nutrients and bacterial activity can also affect the amount of dissolved oxygen in waterways.

Dissolved oxygen levels typically range between 5 and 14 mg/L (or ppm).

Example:



Salinity – Measures:

Electrical conductivity is a measure of the saltiness of the water and is measured on a scale from 0 to 50,000 uS/cm. Electrical conductivity is measured in microsiemens per centimeter (uS/cm). Freshwater is usually between 0 and 1,500 uS/cm and typical sea water has a conductivity value of about 50,000 uS/cm.

Examples:

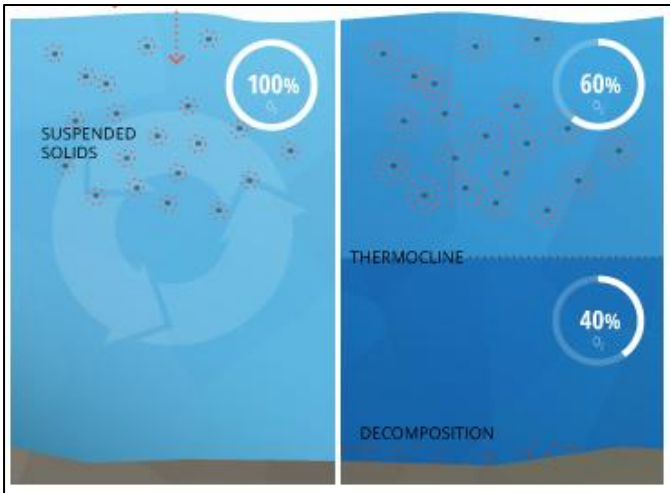
µS/cm	Use
0 - 800	• Good drinking water for humans (provided there is no organic pollution and not too much suspended clay material) • Generally good for irrigation, though above 300µS/cm some care must be, particularly with overhead sprinklers, which may cause leaf, scorch on some salt sensitive plants. • Suitable for all livestock
800 - 2500	• Can be consumed by humans, although most would prefer water in the lower half of this range if available • When used for irrigation, requires special management including suitable soils, good drainage and consideration of salt tolerance of plants • Suitable for all livestock
2500 -10,000	• Not recommended for human consumption, although water up to 3000 µS/cm can be consumed • Not normally suitable for irrigation, although water up to 6000 µS/cm can be used on very salt tolerant crops with very special management techniques. Over 6000 µS/cm, occasional emergency may be possible with care • When used for drinking water by poultry and pigs, the salinity should be limited to about 6000 µS/cm. Most other livestock can use water up to 10000 µS/cm

Total Dissolve Solids (TDS) – Measures

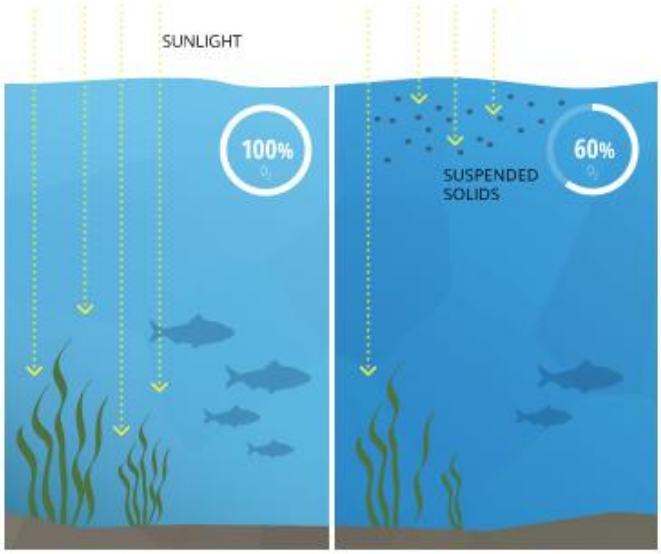
Dissolved solids, smaller than 2 microns, refer to any minerals, salts, metals, in the form of molecules, atoms, cations or anions dissolved in water. Total dissolved solids (TDS) comprise inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates) and some small amounts of organic matter that dissolve in water.

The TDS concentration is the sum of all filterable substances in water that can be determined gravimetrically. However, in most cases, TDS is primarily comprised of ions.

High levels of total suspended solids can affect turbidity, increase water temperatures and decrease dissolved oxygen (DO) levels. This can cause the water to heat up more rapidly because the suspended particles absorb more heat and deplete oxygen, which can adversely affect aquatic life.



Suspended solids can increase the temperature of water as they absorb additional heat from the sun. This can also cause dissolved oxygen levels to drop below the thermocline, creating hypoxic conditions.



Suspended solids, particularly algae, can block sunlight from reaching submerged plants. This can cause dissolved oxygen levels to drop, as the plants rely on respiration (consuming oxygen) instead of photosynthesis.

Turbidity – Total Suspended Solids (TSS)

Turbidity data are reported in Nephelometric Turbidity Units (NTU). To provide a sense of scale, water with a turbidity of 1 NTU is crystal clear, water at 5 NTU has a tiny trace of discolouration, and water at 100 NTU is brown and opaque. The standard is less than 10 NTU for rural streams and rivers and less than 30 NTU for urban lakes and ponds.

Total suspended solids (TSS) are particles that are larger than 2 microns found in the water column. Anything smaller than 2 microns (average filter size) is considered a dissolved solid. Most suspended solids are made up of inorganic materials, though bacteria and algae can also contribute to the total solids concentration.

Both organic and inorganic particles of all sizes can contribute to the suspended solids concentration.

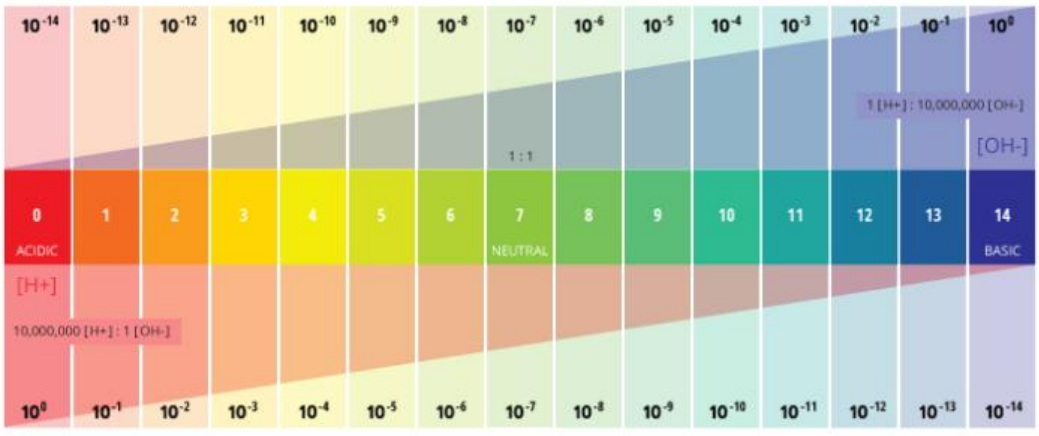
pH – Acidity / Alkalinity – Measures

The pH refers to the degree of acidity or alkalinity of a substance. A pH of 7 is neutral. A value above 7 indicates that the water is more alkaline and a pH below 7 indicates acidic conditions.

A pH of 7 is considered neutral. The logarithmic scale means that each number below 7 is 10 times more acidic than the previous number when counting down. Likewise, when counting up above 7, each number is 10 times more basic than the previous number pH stands for the "power of hydrogen" [3]. The numerical value of pH is determined by the molar concentration of hydrogen ions (H+) [3]. This is done by taking the negative logarithm of the H+ concentration (-log(H+)).

Standard values for pH readings are expected, pH 6.5–9 for rural streams and rivers and pH 6–9 for urban lakes and ponds.

In freshwater systems pH sets up the conditions for how easy it is for nutrients to be available and how easily things like heavy metals (toxicity for aquatic life) can dissolve in the water. Rivers and lakes generally range between 5 (acidic) and 9 (basic) on the pH scale.



The logarithmic scale of pH means that as pH increases, the H+ concentration will decrease by a power of 10. Thus at a pH of 0, H+ has a concentration of 1 M. At a pH of 7, this decreases to 0.0000001 M. At a pH of 14, there is only 0.00000000000001 M

Summary of results

Aquatic ecosystems	
Indicator	**Numerical criteria (trigger values)**
Total phosphorus 30 µg/L	• Upland rivers: 20 µg/L • Lowland rivers: 25 µg/L for rivers flowing to the coast; • Lakes & reservoirs: 10 µg/L • Estuaries: 30 µg/L
Total nitrogen 600 µg/L	• Upland rivers: 250 µg/L • Lowland rivers: 350 µg/L for rivers flowing to the coast; • Lakes & reservoirs: 350 µg/L • Estuaries: 300µg/L
Chlorophyll-a	• Upland rivers: not applicable • Lowland rivers: 5 µg/L • Lakes & reservoirs: 5 µg/L. • Estuaries: 4 µg/L.
Turbidity 2.87	• Upland rivers: 2–25 NTU (see supporting information) • Lowland rivers: 6–50 NTU (see supporting information) • Lakes & reservoirs: 1–20 NTU • Estuaries: 0.5–10 NTU
Salinity (electrical conductivity) 446.6 µs/cm	• Upland rivers: 30–350 µS/cm • Lowland rivers: 125–2200 µS/cm supporting information
Dissolved oxygen 10.47 ppm	• Upland rivers: 90–110% • Lowland rivers: 85–110% • Freshwater lakes & reservoirs: 90–110% • Estuaries: 80–110% Note: Dissolved oxygen values were derived from daytime measurements. Dissolved oxygen concentrations may vary diurnally and with depth. Monitoring programs should assess this potential variability.
pH 8.08	• Upland rivers: 6.5–8.0 • Lowland rivers: 6.5–8.5 • Freshwater lakes & reservoirs: 6.5–8.0 • Estuaries: 7.0–8.5 Changes of more than 0.5 pH units from the natural seasonal maximum or minimum should be investigated.

Map Image 1. Stormwater Testing Site – Moorebank Logistics Park

Sample Site Map

0 30 60 120 Meters

Client: M.I.D Plumbing	Map Issue: Basin 6 Sample Site Map
Address: BUSHMASTER AVENUE MOOREBANK2170	Time: 10/07/2024 2:24 PM

LGA: LIVERPOOL CITY COUNCIL	Scale: 1:2,000
Lot/DP: 5 to 14/DP 1299137	Spatial Reference: WGS 1984 Web Mercator Auxiliary Sphere
Units: Meters	

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STORMWATER DISCHARGE TESTING SITE

Site image 1. Testing site Basin 6 - Outflow

Table. In-situ data and observations Retention Basin 6 outflow

Moorebank West Precinct - Retention Basin 6 Outflow (MPW outflow)			
Date: 09/04/2025	**Time:** 12:50pm	**Temp:** 21°C	**Humidity:** 80%
Operator: Marco Perry		**Coordinates:** -33.947085, 150.917653	
Equipment used: Aquatroll 500			
Parameter	**Recording**	**ANZECC** ANZECC 2000 Guidelines *Lowland rivers	**Triggered?** Y/N
Temperature (Celcius)	21.1	Abnormal to seasonal variation	N
Dissolved Oxygen (DO %)	114%	*Lowland rivers Lower limit: 85% Upper Limit: 110%	
Dissolved Oxygen (DO ppm)	10.47 ppm	*Lowland rivers Lower limit: 85% Upper Limit: 110%	N
Electrical Conductivity (C- um/cm)	446.6 C- us/cm	125–2200 µS/cm	N
pH	8.08	Min 6.5 Max 8.5	N
NTU	2.87	6-50	Y

(a) Total phosphorus

Basin 6.1 inflow - Total phosphorous – Qube Logistics, Moorebank, NSW		Trigger Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results - Total phosphorous:	30 µg/L	25 µg/L - 50 µg/L	N
Notes: • Channel Culvert • Trigger value 50 µg/L for lowland rivers, trigger value 25 µg/L for rivers flowing to the coast Anzecc Guidelines 2000.			

(b) Total Nitrogen as N (TKN + NOx) by Discrete Analyser

Basin 6.1 inflow - Total nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results -Total nitrogen:	600 µg/L	350 µg/L for rivers flowing to the coast	Y
Notes: • Total Nitrogen as N (TKN + NOx) by Discrete Analyser • Trigger values are based on a low-lying river			

(c) Kjeldahl nitrogen Total Kjeldahl Nitrogen as N

Basin 6.1 inflow - Kjeldahl nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results – kjeldahl nitrogen:	500 µg/L	-	-
Notes: • Total Kjeldahl Nitrogen as N			

(d) Dissolved metals;

Basin 6.1 inflow - Dissolved metals – Qube Logistics, Moorebank, NSW			
Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			
Lab results – Dissolved metals:	**Measures mg/L**	**Trigger value ANZECC Guidelines 2000 95% protection criteria**	**Triggered**
Arsenic	<0.001	0.013 mg/L	N
Cadmium	<0.0001	0.0002 mg/L	N
Chromium	<0.001	0.001 mg/L	N
Copper	0.002	0.0014mg/L	Y
Nickel	<.001	0.011 mg/L	N
Lead	<0.001	0.0034 mg/L	N
Zinc	<0.005	0.008 mg/L	N
Mercury	<0.0001	0.0006 mg/L	N
Notes: - ANZECC Guidelines (2000) suggest 0.002 mg/L is considered appropriate for slightly-moderately disturbed systems. - Copper exceeds ANZECC Guidelines			

(e) PFAS;

Basin 6.1 inflow - PFAS – Qube Logistics, Moorebank, NSW			
PFAS Surrogate	**Measure** µg/L	**95% species protection (DEE 2016)**	**Triggered**
13C4-PFOS **Sum of PFAS µg/L**	102% 0.32µg/L	 .13 (µg/L)	
13C8-PFOA % **Sum of PFHxS and PFOS**	101% .24µg/L	 220 (µg/L)	
Notes: This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include: • Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation. • PFOS and PFOA can also be the breakdown endpoint of other precursor products. • PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife. • Information on other PFASs, of which there are several hundred known, is more limited. • Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present. * DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.			

(f) Total suspended solids.

Basin 6.1 inflow - Total suspended solids – Qube Logistics, Moorebank, NSW		EPA exceedance value	Trigger
Lab results – Total suspended solids: mg/L	11 mg/L	50 mg/L	N
Notes: • Total Suspended Solids dried at 104 ± 2°C			

(g) Total hydrocarbons

Basin 6.1 inflow - Total hydrocarbons – Qube Logistics, Moorebank, NSW							
Lab results -Total hydrocarbons:	Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem	Triggered	Baseline monitoring May 2024 (Apical)	Monitoring discharge points October 2024 (Apical)	Monitoring discharge points April 2025 (Apical)	Monitoring discharge points Month Year (Apical)	Trend
Benzene µg/L	1300 µg/L	N	<1	<1	<1		No change
Toluene µg/L	-	N	<2	<2	<2		No change
Ethylbenzene µg/L	-	N	<2	<2	<2		No change
meta-& para-Xylene µg/L	200 µg/L	N	<2	<2	<2		No change
Ortho-Xylene µg/L	470 µg/L	N	<2	<2	<2		No change
Total Xylenes µg/L	-	-	<2	<2	<2		No change
Sum of BTEX µg/L	-	-	<1	<1	<1		No change
Naphthalene µg/L	85 µg/L	N	<5	<5	<5		No change
Notes: • The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia. • A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX							

Water Quality Monitoring Comparative Table (Temporal)

Retention Basin 6 MPW. Testing Site MPW 6 outflow

Testing Site 6 MPW Inflow	May 2024	Oct 2024	April 2025
pH	8.54	6.51	8.08
Dissolved Oxygen - %/L	5.5 DO mg/L	10.4ppm	10.47ppm
Actual Electronic Conductivity - ms/cm	0.627 SPC - ms/cm	7.3 <0.0001 (C-$^{um/cm}$)	0.482 (C-$^{um/cm}$)
Temperature - ℃	14.4	20.1	21.1
Turbidity	6.13 NTU	6.73 NTU	2.87
Total phosphorous - mg/L	0.42 mg/L	0.16 mg/L	0.03 mg/L
Total nitrogen - mg/L	3.7 mg/L	1.1 mg/L	0.6 mg/L
Kjeldahl nitrogen mg/L	1.8 mg/L	1.0 mg/L	0.5 mg/L
Dissolved metals			
Arsenic	0.003	<0.001	<0.001
Cadmium	<0.0001	<0.0001	<0.0001
Chromium	0.001	<0.001	<0.001
Copper	0.005	0.001	0.002
Nickel	0.002	0.002	<0.001
Lead	<0.001	<0.001	<0.001
Zinc	0.021	<0.005	<0.005
Mercury	<0.0001	<0.0001	<0.0001
PFAS			
Lab results – SUM of PFAS Micrograms/L	0.10	1.55	.32
SUM of PFHxS & PFOS Microgrms/L	0.03	1.08	.24
Total suspended solids mg/L	<5	24	13
Total hydrocarbons			
Benzene	<1	<1	<1
Toluene	<2	<2	<2
Ethylbenzene	<2	<2	<2
meta-& para-Xylene	<2	<2	<2
Ortho-Xylene	<2	<2	<2
Total Xylenes	<2	<2	<2
Sum of BTEX	<1	<1	<1
Naphthalene	<5	<5	<5

Appendix A. Raw data tables; source - Australian Laboratory Services (WMP 7 is reference to Basin 6)

Page	: 7 of 11
Work Order	: EW2501914
Client	: Apical Bushfire and Planning
Project	: Moorebank East + West

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	WMP8	WMP7	WMP5	----	----
				Sampling date / time	09-Apr-2025 13:10	09-Apr-2025 12:50	09-Apr-2025 12:30	----	----
Compound	CAS Number	LOR	Unit		EW2501914-006	EW2501914-007	EW2501914-008	--------	--------
					Result	Result	Result	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**13**	**11**	**10**	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	**0.002**	**0.005**	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	**0.001**	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	<0.005	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.01**	**0.09**	**0.05**	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.4**	**0.5**	**0.3**	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.4**	**0.6**	**0.4**	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.04**	**0.03**	<0.01	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	WMP8	WMP7	WMP5	----	----
			Sampling date / time	09-Apr-2025 13:10	09-Apr-2025 12:50	09-Apr-2025 12:30	----	----
Compound	CAS Number	LOR	Unit	EW2501914-006	EW2501914-007	EW2501914-008	--------	--------
				Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L	<100	<100	<100	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L	<100	<100	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ **Total Xylenes**	----	2	µg/L	<2	<2	<2	----	----
^ **Sum of BTEX**	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	**0.11**	<0.02	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.01**	**0.13**	**0.01**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	WMP8	WMP7	WMP5	----	----
				Sampling date / time	09-Apr-2025 13:10	09-Apr-2025 12:50	09-Apr-2025 12:30	----	----
Compound	CAS Number	LOR	Unit		EW2501914-006	EW2501914-007	EW2501914-008	--------	--------
					Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	**0.04**	**0.03**	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	**0.04**	**0.03**	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	**0.01**	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	----	----
Perfluorohexadecanoic acid (PFHxDA)	67905-19-5	0.05	µg/L		<0.05	<0.05	<0.05	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	WMP8	WMP7	WMP5	-----	-----
				Sampling date / time	09-Apr-2025 13:10	09-Apr-2025 12:50	09-Apr-2025 12:30	----	----
Compound	CAS Number	LOR	Unit		EW2501914-006	EW2501914-007	EW2501914-008	--------	--------
					Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**0.01**	**0.32**	**0.08**	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.01**	**0.24**	**0.01**	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.01**	**0.32**	**0.08**	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**98.8**	**90.8**	**88.8**	----	----
Toluene-D8	2037-26-5	2	%		**93.6**	**85.2**	**81.0**	----	----
4-Bromofluorobenzene	460-00-4	2	%		**94.7**	**86.2**	**81.8**	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**102**	**102**	**100**	----	----
13C8-PFOA	----	0.02	%		**101**	**105**	**105**	----	----

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) EK067G: Total Phosphorus as P by Discrete Analyser
(WATER) EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser
(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EG035F: Dissolved Mercury by FIMS
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EP080/071: Total Petroleum Hydrocarbons
(WATER) EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions
(WATER) EP080: BTEXN
(WATER) EP080S: TPH(V)/BTEX Surrogates
(WATER) EP231A: Perfluoroalkyl Sulfonic Acids
(WATER) EP231B: Perfluoroalkyl Carboxylic Acids
(WATER) EP231C: Perfluoroalkyl Sulfonamides
(WATER) EP231D: (n:2) Fluorotelomer Sulfonic Acids
(WATER) EP231P: PFAS Sums
(WATER) EP231S: PFAS Surrogate
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C

Appendix B. ANZECC & ARMCANZ (2000) water quality guidelines

Table 3.4.1 Trigger values for toxicants at alternative levels of protection. Values in grey shading are the trigger values applying to typical *slightly–moderately disturbed systems*; see table 3.4.2 and Section 3.4.2.4 for guidance on applying these levels to different ecosystem conditions.

Chemical		Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
		Level of protection (% species)				Level of protection (% species)			
		99%	95%	90%	80%	99%	95%	90%	80%
METALS & METALLOIDS									
Aluminium	pH >6.5	27	55	80	150	ID	ID	ID	ID
Aluminium	pH <6.5	ID	ID	ID	ID	ID	ID	ID	ID
Antimony		ID	ID	ID	ID	ID	ID	ID	ID
Arsenic (As III)		1	24	94 [C]	360 [C]	ID	ID	ID	ID
Arsenic (AsV)		0.8	13	42	140 [C]	ID	ID	ID	ID
Beryllium		ID	ID	ID	ID	ID	ID	ID	ID
Bismuth		ID	ID	ID	ID	ID	ID	ID	ID
Boron		90	370 [C]	680 [C]	1300 [C]	ID	ID	ID	ID
Cadmium	H	0.06	0.2	0.4	0.8 [C]	0.7 [B]	5.5 [B, C]	14 [B, C]	36 [B, A]
Chromium (Cr III)	H	ID	ID	ID	ID	7.7	27.4	48.6	90.6
Chromium (CrVI)		0.01	1.0 [C]	6 [A]	40 [A]	0.14	4.4	20 [C]	85 [C]
Cobalt		ID	ID	ID	ID	0.005	1	14	150 [C]
Copper	H	1.0	1.4	1.8 [C]	2.5 [C]	0.3	1.3	3 [C]	8 [A]
Gallium		ID	ID	ID	ID	ID	ID	ID	ID
Iron		ID	ID	ID	ID	ID	ID	ID	ID
Lanthanum		ID	ID	ID	ID	ID	ID	ID	ID
Lead	H	1.0	3.4	5.6	9.4 [C]	2.2	4.4	6.6 [C]	12 [C]
Manganese		1200	1900 [C]	2500 [C]	3600 [C]	ID	ID	ID	ID
Mercury (inorganic)	B	0.06	0.6	1.9 [C]	5.4 [A]	0.1	0.4 [C]	0.7 [C]	1.4 [C]
Mercury (methyl)		ID	ID	ID	ID	ID	ID	ID	ID
Molybdenum		ID	ID	ID	ID	ID	ID	ID	ID
Nickel	H	8	11	13	17 [C]	7	70 [C]	200 [A]	560 [A]
Selenium (Total)	B	5	11	18	34	ID	ID	ID	ID
Selenium (SeIV)	B	ID	ID	ID	ID	ID	ID	ID	ID
Silver		0.02	0.05	0.1	0.2 [C]	0.8	1.4	1.8	2.6 [C]
Thallium		ID	ID	ID	ID	ID	ID	ID	ID
Tin (inorganic, SnIV)		ID	ID	ID	ID	ID	ID	ID	ID
Tributyltin (as µg/L Sn)		ID	ID	ID	ID	0.0004	0.006 [C]	0.02 [C]	0.05 [C]
Uranium		ID	ID	ID	ID	ID	ID	ID	ID
Vanadium		ID	ID	ID	ID	50	100	160	280
Zinc	H	2.4	8.0 [C]	15 [C]	31 [C]	7	15 [C]	23 [C]	43 [C]
NON-METALLIC INORGANICS									
Ammonia	D	320	900 [C]	1430 [C]	2300 [A]	500	910	1200	1700
Chlorine	E	0.4	3	6 [A]	13 [A]	ID	ID	ID	ID
Cyanide	F	4	7	11	18	2	4	7	14
Nitrate	J	17	700	3400 [C]	17000 [A]	ID	ID	ID	ID
Hydrogen sulfide	G	0.5	1.0	1.5	2.6	ID	ID	ID	ID
ORGANIC ALCOHOLS									
Ethanol		400	1400	2400 [C]	4000 [C]	ID	ID	ID	ID
Ethylene glycol		ID	ID	ID	ID	ID	ID	ID	ID
Isopropyl alcohol		ID	ID	ID	ID	ID	ID	ID	ID
CHLORINATED ALKANES									
Chloromethanes									
Dichloromethane		ID	ID	ID	ID	ID	ID	ID	ID
Chloroform		ID	ID	ID	ID	ID	ID	ID	ID
Carbon tetrachloride		ID	ID	ID	ID	ID	ID	ID	ID
Chloroethanes									
1,2-dichloroethane		ID	ID	ID	ID	ID	ID	ID	ID
1,1,1-trichloroethane		ID	ID	ID	ID	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
1,1,2-trichloroethane	5400	6500	7300	8400	140	1900	5800 [C]	18000 [C]
1,1,2,2-tetrachloroethane	ID	ID	ID	ID	ID	ID	ID	ID
Pentachloroethane	ID	ID	ID	ID	ID	ID	ID	ID
Hexachloroethane B	290	360	420	500	ID	ID	ID	ID
Chloropropanes								
1,1-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
1,2-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
CHLORINATED ALKENES								
Chloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1-dichloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1,2-trichloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1,2,2-tetrachloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
3-chloropropene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloropropene	ID	ID	ID	ID	ID	ID	ID	ID
ANILINES								
Aniline	8	250 [A]	1100 [A]	4800 [A]	ID	ID	ID	ID
2,4-dichloroaniline	0.6	7	20	60 [C]	ID	ID	ID	ID
2,5-dichloroaniline	ID	ID	ID	ID	ID	ID	ID	ID
3,4-dichloroaniline	1.3	3	6 [C]	13 [C]	85	150	190	260
3,5-dichloroaniline	ID	ID	ID	ID	ID	ID	ID	ID
Benzidine	ID	ID	ID	ID	ID	ID	ID	ID
Dichlorobenzidine	ID	ID	ID	ID	ID	ID	ID	ID
AROMATIC HYDROCARBONS								
Benzene	600	950	1300	2000	500 [C]	700 [C]	900 [C]	1300 [C]
Toluene	ID	ID	ID	ID	ID	ID	ID	ID
Ethylbenzene	ID	ID	ID	ID	ID	ID	ID	ID
o-xylene	200	350	470	640	ID	ID	ID	ID
m-xylene	ID	ID	ID	ID	ID	ID	ID	ID
p-xylene	140	200	250	340	ID	ID	ID	ID
m+*p*-xylene	ID	ID	ID	ID	ID	ID	ID	ID
Cumene	ID	ID	ID	ID	ID	ID	ID	ID
Polycyclic Aromatic Hydrocarbons								
Naphthalene	2.5	16	37	85	50 [C]	70 [C]	90 [C]	120 [C]
Anthracene B	ID	ID	ID	ID	ID	ID	ID	ID
Phenanthrene B	ID	ID	ID	ID	ID	ID	ID	ID
Fluoranthene B	ID	ID	ID	ID	ID	ID	ID	ID
Benzo(a)pyrene B	ID	ID	ID	ID	ID	ID	ID	ID
Nitrobenzenes								
Nitrobenzene	230	550	820	1300	ID	ID	ID	ID
1,2-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,4-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3,5-trinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-methoxy-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-methoxy-4-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-3-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-4-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-2,4-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,2-dichloro-3-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloro-5-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,4-dichloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
2,4-dichloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Hexazinone	ID	ID	ID	ID	ID	ID	ID	ID
Simazine	0.2	3.2	11	35	ID	ID	ID	ID
Urea herbicides								
Diuron	ID	ID	ID	ID	ID	ID	ID	ID
Tebuthiuron	0.02	2.2	20	160 [C]	ID	ID	ID	ID
Miscellaneous herbicides								
Acrolein	ID	ID	ID	ID	ID	ID	ID	ID
Bromacil	ID	ID	ID	ID	ID	ID	ID	ID
Glyphosate	370	1200	2000	3600 [A]	ID	ID	ID	ID
Imazethapyr	ID	ID	ID	ID	ID	ID	ID	ID
Ioxynil	ID	ID	ID	ID	ID	ID	ID	ID
Metolachlor	ID	ID	ID	ID	ID	ID	ID	ID
Sethoxydim	ID	ID	ID	ID	ID	ID	ID	ID
Trifluralin B	2.6	4.4	6	9 [A]	ID	ID	ID	ID
GENERIC GROUPS OF CHEMICALS								
Surfactants								
Linear alkylbenzene sulfonates (LAS)	65	280	520 [C]	1000 [C]	ID	ID	ID	ID
Alcohol ethoxyolated sulfate (AES)	340	650	850 [C]	1100 [C]	ID	ID	ID	ID
Alcohol ethoxylated surfactants (AE)	50	140	220	360 [C]	ID	ID	ID	ID
Oils & Petroleum Hydrocarbons	ID	ID	ID	ID	ID	ID	ID	ID
Oil Spill Dispersants								
BP 1100X	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 7664	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 8667		ID	ID	ID	ID	ID	ID	ID
Corexit 9527	ID	ID	ID	ID	230	1100	2200	4400 [A]
Corexit 9550	ID	ID	ID	ID	ID	ID	ID	ID

Notes: Where the final water quality guideline to be applied to a site is below current analytical practical quantitation limits, see Section 3.4.3.3 for guidance.

Most trigger values listed here for metals and metalloids are *High reliability* figures, derived from field or chronic NOEC data (see 3.4.2.3 for reference to Volume 2). The exceptions are *Moderate reliability* for freshwater aluminium (pH >6.5), manganese and marine chromium (III).

Most trigger values listed here for non-metallic inorganics and organic chemicals are *Moderate reliability* figures, derived from acute LC_{50} data (see 3.4.2.3 for reference to Volume 2). The exceptions are *High reliability* for freshwater ammonia, 3,4-DCA, endosulfan, chlorpyrifos, esfenvalerate, tebuthiuron, three surfactants and marine for 1,1,2-TCE and chlorpyrifos.

* = *High reliability* figure for esfenvalerate derived from mesocosm NOEC data (no alternative protection levels available).

A = Figure may not protect key test species from acute toxicity (and chronic) — check Section 8.3.7 for spread of data and its significance. 'A' indicates that trigger value > acute toxicity figure; note that trigger value should be <1/3 of acute figure (Section 8.3.4.4).

B = Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered (see Sections 8.3.3.4 and 8.3.5.7).

C = Figure may not protect key test species from chronic toxicity (this refers to experimental chronic figures or geometric mean for species) — check Section 8.3.7 for spread of data and its significance. Where grey shading and 'C' coincide, refer to text in Section 8.3.7.

D = Ammonia as TOTAL ammonia as [NH_3-N] at pH 8. For changes in trigger value with pH refer to Section 8.3.7.2.

E = Chlorine as total chlorine, as [Cl]; see Section 8.3.7.2.

F = Cyanide as un-ionised HCN, measured as [CN]; see Section 8.3.7.2.

G = Sulfide as un-ionised H_2S, measured as [S]; see Section 8.3.7.2.

H = Chemicals for which algorithms have been provided in table 3.4.3 to account for the effects of hardness. The values have been calculated using a hardness of 30 mg/L $CaCO_3$. These should be adjusted to the site-specific hardness (see Section 3.4.3).

J = Figures protect against toxicity and do not relate to eutrophication issues. Refer to Section 3.3 if eutrophication is the issue of concern.

ID = Insufficient data to derive a reliable trigger value. Users advised to check if a low reliability value or an ECL is given in Section 8.3.7.

T = Tainting or flavour impairment of fish flesh may possibly occur at concentrations below the trigger value. See Sections 4.4.5.3/3 and 8.3.7.

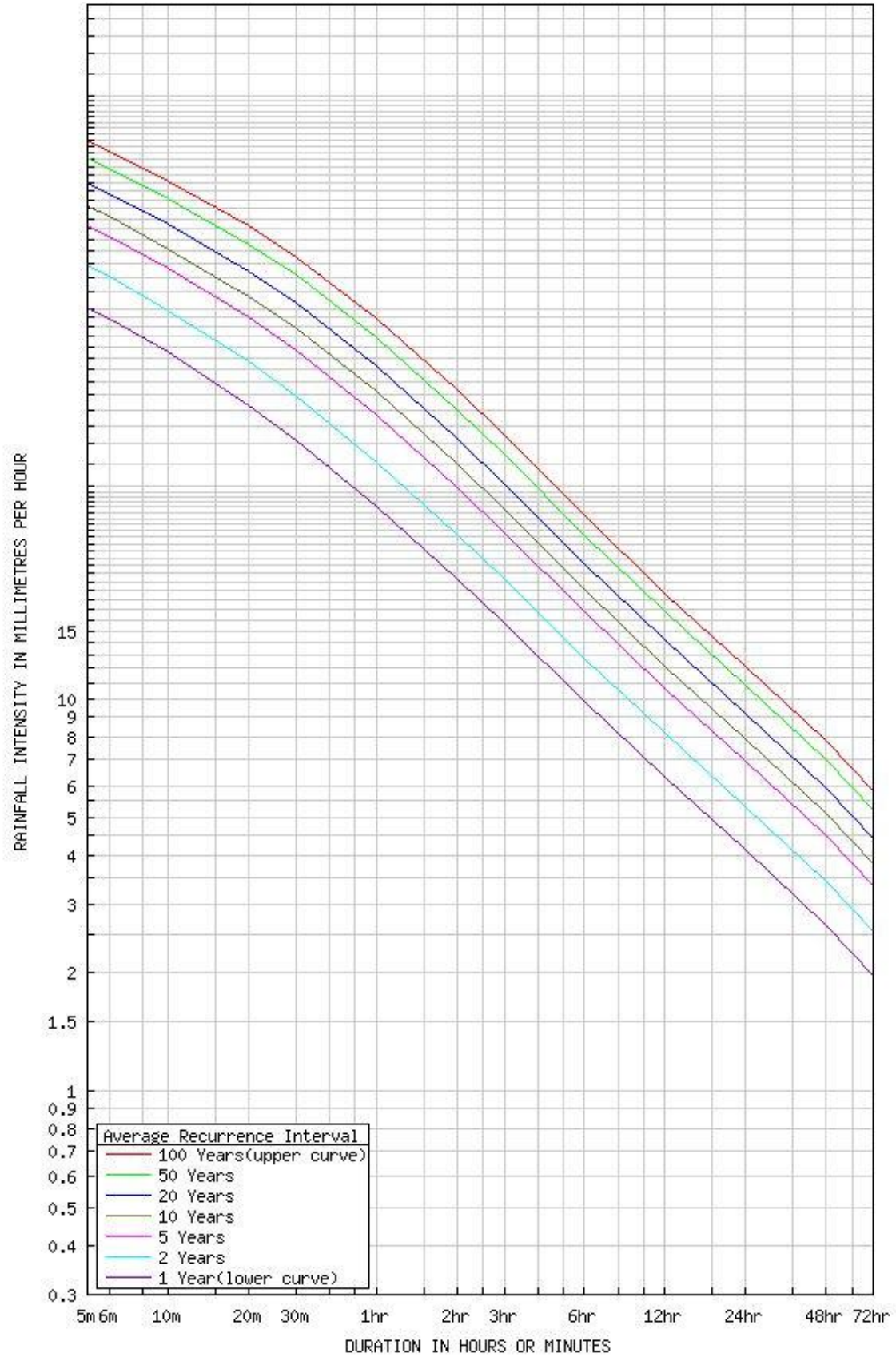
Table 5. Ecological water quality guideline values developed by water regulators

Exposure scenario	PFOS	PFOA	Exposure scenario	Comments and source
Freshwater	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	Australian and New Zealand Guidelines for Fresh and Marine Water Quality - technical draft default guideline values for PFOS and PFOA. Note 1: The 99% species protection level for PFOS is close to the level of detection. Agencies may wish to apply a 'detect' threshold in such circumstances rather than a quantified measurement. Note 2: The draft guidelines do not account for effects which result from the biomagnification of toxicants in air-breathing animals or in animals which prey on aquatic organisms. Note 3: The WQGs advise[41] that the 99% level of protection be used for slightly to moderately disturbed systems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. Regulators may specify or environmental legislation may prescribe the level of species protection required, rather than allowing for case-by-case assessments.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	
Interim marine	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	As above. Freshwater values are to be used on an interim basis until final marine guideline values can be set using the nationally-agreed process under the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Note 1: The WQG advise that in the case of estuaries, the most stringent of freshwater and marine criteria apply, taking account of any available salinity correction. Note 2: Marine guideline values developed by CRC CARE are under consideration through the nationally-agreed water quality guideline development process.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	

https://www.waterquality.gov.au/sites/default/files/documents/ANZECC-1992-guidelines.pdf

Type of indicator	Indicator	Units	Fresh waters	Marine waters
	Dissolved oxygen[2]	mg/L	> 6 (> 80–90% saturation)	> 6 (> 80–90% saturation)
	Nutrients/nuisance growths	–	(Section 2.3.3)	(Section 2.3.3)
	pH	–	6.5–9.0	< 0.2 pH unit change
	Salinity	mg/L	< 1000 (about 1,500 µS/cm)	–
	Suspended particulate matter/turbidity	–	< 10% change seasonal mean concentration (see also colour & clarity)	< 10% change seasonal mean concentration (see also colour & clarity)
	Temperature[3]	–	< 2°C increase	< 2°C increase
Toxicants				
Inorganic toxicants	Aluminium	µg/L	< 5.0 (if pH < = 6.5)	NR
	Aluminium	µg/L	< 100.0 (if pH > 6.5)	–
	Ammonia	µg/L	20.0–30.0 (Table 2.3)	NR
	Antimony	µg/L	30.0	500.0
	Arsenic	µg/L	50.0	50.0
	Beryllium	µg/L	4.0[4]	NR
	Cadmium	µg/L	0.2–2.0[5]	2.0
	Chromium	µg/L	10.0	50.0
	Copper	µg/L	2.0–5.0[5]	5.0
	Cyanide	µg/L	5.0	5.0
	Iron	µg/L	1,000.0[6]	NR
	Lead	µg/L	1.0–5.0[5]	5.0
	Mercury	µg/L	0.1	0.1
	Nickel	µg/L	15.0–150.0[5]	15.0
	Selenium	µg/L	5.0	70.0
	Silver	µg/L	0.1	1.0
	Sulfide	µg/L	2.0	2.0
	Thallium	µg/L	4.0	20.0
	Tin (tributyltin)	µg/L	0.008	0.002
	Zinc	µg/L	5.0–50.0[6]	50.0
Organic toxicants	Acrylonitrile	µg/L	NR	NR
	Benzidine	µg/L	NR	NR
	Dichlorobenzidine	µg/L	NR	NR
	Diphenylhydrazine	µg/L	NR	NR
Halogenated aliphatic compounds	Hexachlorobutadiene	µg/L	0.1	0.3
	Halogenated ethers	µg/L	NR	NR
	Isophorone	µg/L	NR	NR
Monocyclic aromatic compounds	Benzene	µg/L	300.0	300.0
	Chlorinated benzenes	µg/L	(Table 2.8)	NR

Appendix C. Intensity Frequency Duration – Average Recurrence Interval Indicator
Intensity-Frequency-Duration (bom.gov.au)



Moorebank Logistics Park West Precinct

Basin 8

Autumn Stormwater Network Water Quality Monitoring Data & Reporting April 2025

Site image: retention basin 8 MPW (Apical image April 2025)

Prepared for: MID Plumbing P/L

Prepared by: Daniel Anderson (BEnvSc, MEnvSc)

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ABN: 656 420 10 400

Consulted Documents / database.

Australia and New Zealand Guidelines for fresh and Marine Water Quality (2000)
NATIONAL WATER QUALITY MANAGEMENT STRATEGY - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) - Volume 2 - Aquatic ecosystems

Bureau of Meteorology – Australian Government Australia's official weather forecasts & weather radar - Bureau of Meteorology (bom.gov.au)

Moorebank Intermodal Precinct West – Stage 3 (SSD 10431) | Assessment Report March 2021
https://moorebankintermodalprecinct.com.au/wp-content/uploads/2023/04/MPW-S3-DPIE-assessment-report-to-IPC.pdf

WQM Report Western Precinct _Basin 8_Autumn 2024 – Apical Bushfire and Planning - April 2024

WQM Report Western Precinct _Basin 8_Spring 2024 – Apical Bushfire and Planning - October 2024

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 7709 Applicant: Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings Limited Consent Authority: The Independent Planning Commission Site: Moorebank Avenue, Moorebank Lot 1 DP 1197707 Lot 100 DP 1049508 Lot 101 DP 1049508 Lot 2 DP 1197707 Part Lot 3 DP 1197707 Part Anzac Road and Moorebank Avenue public road reserves Development: Moorebank Precinct West Stage 2 (MPW Stage 2)

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 10431 Applicant: Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings Limited Consent Authority: The Independent Planning Commission Site: Moorebank Avenue, Moorebank Lot 1 DP 1197707 Lot 100 DP 1049508 Lot 101 DP 1049508 Moorebank Precinct West Stage 3 (MPW Stage 3)

Australian Laboratory Services (ALS) Work Order EW2402561 Certificate of Analysis Water Sample Data 09th April 2025.

Liverpool DCP
Liverpool's Development Control Plans | Liverpool City Council (nsw.gov.au)

DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.
https://environment.gov.au/system/files/pages/dfb876c5-581e-48b7-868c-242fe69dad68/files/draft-environmental-mgt-guidance-pfos-pfoa.pdf

Development Consent SSD 7709 - Section 4.38 of the Environmental Planning and Assessment Act 1979
https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2019/05/moorebank-intermodal-precinct-west-stage-2/referral-from-department-of-planning-and-environment/revised-recommended-conditions/mpw-stage-2-recommended-conditions-inclusive-of-edits-191105.pdf

Glossary

The following definitions apply to terms used in this report. Many of these definitions are consistent with relevant national literature and cited where appropriate.

Current status trigger value
Concentrations of water quality indicators that reflect existing ecosystem condition, and therefore provide a target for ecosystem maintenance and a benchmark against which future water quality trends may be monitored.

Environmental value
Particular values or uses of the environment important for a healthy ecosystem or for public benefit, welfare, safety or health and requiring protection from the effects of pollution or degradation (Environment Australia 2002).

Indicator
A parameter (biological, physical or chemical) used to provide a measure of the quality of water or the condition of an ecosystem (Environment Australia 2002).

Low-risk trigger value
Concentrations (or loads) of key performance indicators [of water quality] at which if not exceeded, there is a low risk that adverse biological effects will occur (ANZECC 2000a).

Median
The middle reading, or 50th percentile, of all readings taken. i.e. of the readings 10, 13, 9, 16 and 11 (re-ordering these to read 9, 10, 11, 13 and 16), the median is 11. The mean (or average), is the sum of all values divided by the total number of readings (which in this case equals 11.8).

Reference condition
Refers to a site which is unmodified or minimally modified from 'natural' condition. Most commonly, reference sites are subject to limited disturbance from human activity. The reference condition then serves as a standard or target against which environmental change in other similar sites can be assessed.

Trigger value
A concentration that, if exceeded, would indicate a potential environmental problem, and so 'trigger' a management response, such as further investigation and/or remedial actions (ANZECC 2000a).

Water quality guideline
A numerical concentration level (e.g. of a contaminant) or narrative statement (e.g. visual appearance of a water body) recommended to support and maintain a designated water use (ANZECC 2000a)

1.1 Background

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 3 (the Project) of Moorebank Precinct West (MPW), which comprises the third stage of development within the Moorebank Precinct West under Development Approval SSD-10431.

The proposal is SSD under clause 19 of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011, as it is development for the purpose of rail and related transport facilities.

The MPW site is located on the western side of Moorebank Avenue and forms the western section of the Moorebank Intermodal Precinct (Map image 1 & 2). The MPW site is approximately 2.5 kilometres (km) from the Liverpool city centre, 27 km south-west of the Sydney Central Business District (CBD) and 26 km west of Port Botany.

The MPW site is irregular in shape, approximately 3 km from north to south and 960 m from east to west at its widest point and covers an area of approximately 220 ha. It is situated between the Georges River to the west (with the SSFL running north-south to the west of the river); and Moorebank Avenue to the east.

Works on the MPW site to date have commenced under two current and active development consents:

• MPW Stage 1 early works, which provides demolition, rehabilitation, remediation of contaminated land, and the establishment of construction facilities and access including site security (as part of the SSD 5066 consent)

• MPW Stage 2, which provides for the construction and 24/7 operation of an intermodal facility and associated warehousing (SSD 7709).

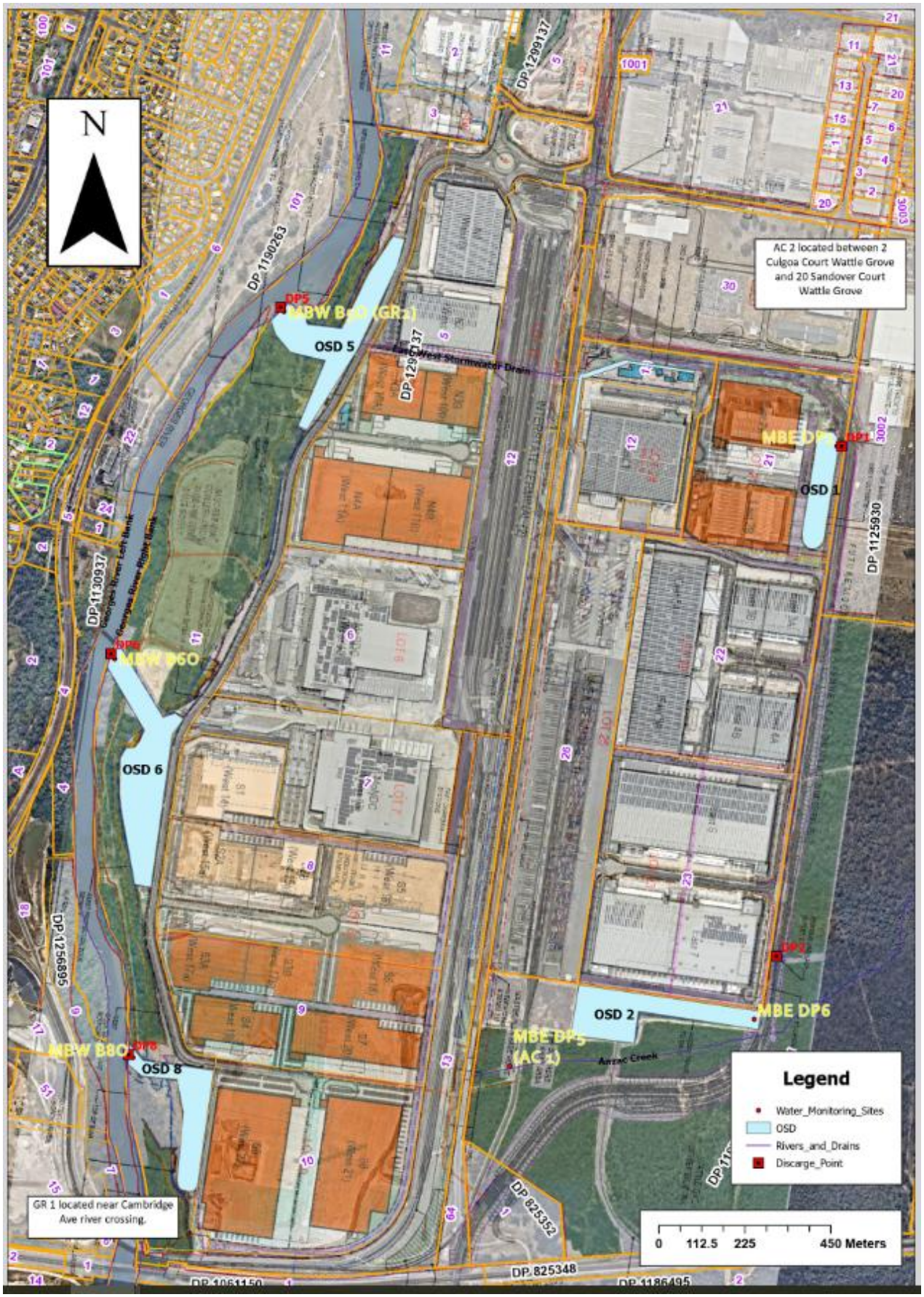
Across the entire precinct there are six onsite detention basins. Bioretention/biofiltration systems also make up the stormwater management infrastructure within the site.

This water quality monitoring program is guided by the Stormwater Infrastructure Operation and Maintenance Plan (SIOPM) and is provided to Qube Holdings Limited (the Applicant) on behalf of MID Plumbing. Three onsite bio-retention basins are present within Moorebank Precinct West. This report is in reference to Basin 8 (MPW – south).

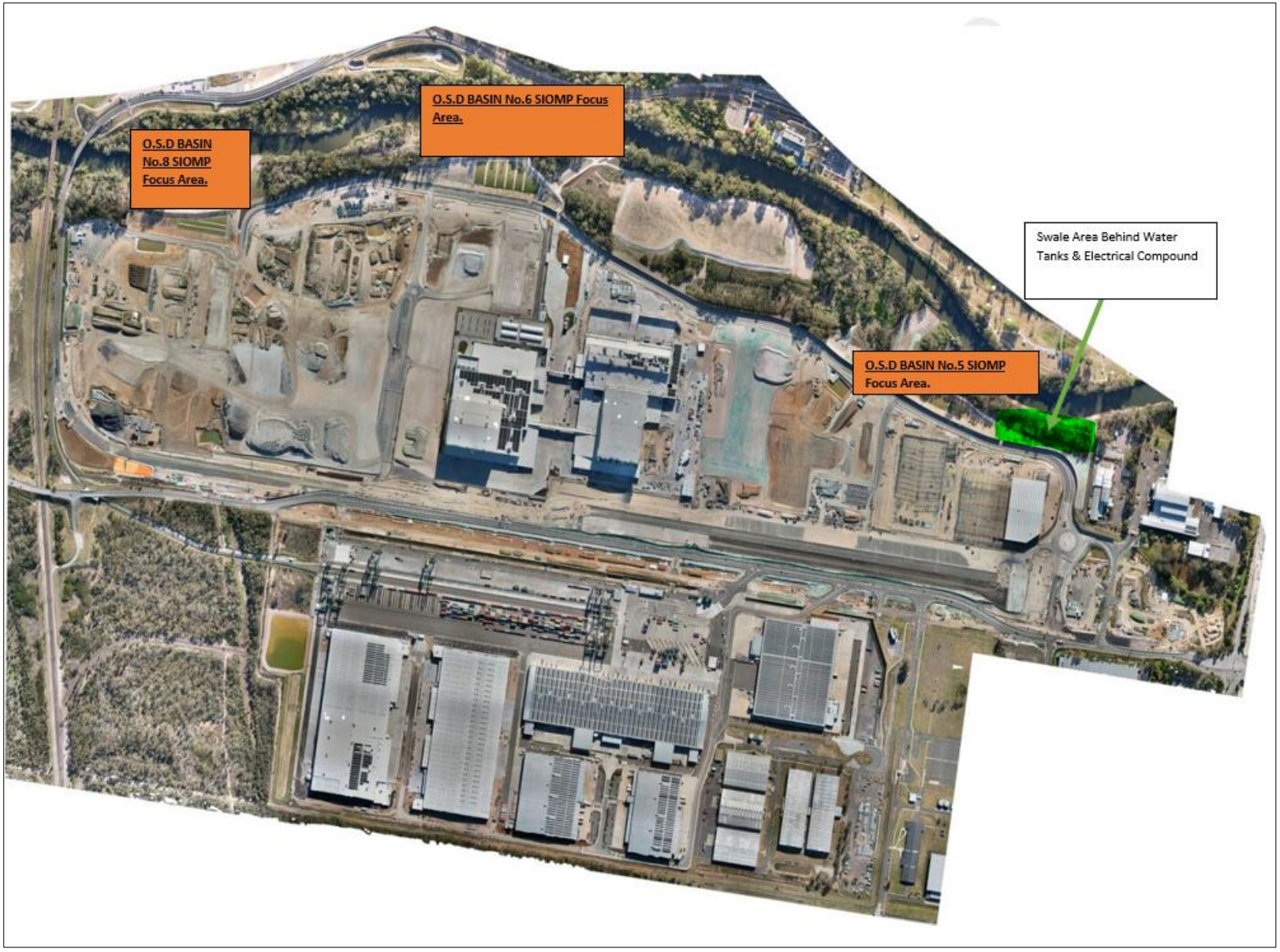
Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 7709 Moorebank Precinct West Stage 2 (MPW Stage 2)

CoC	Requirement
Stormwater Quality Monitoring	
B38.	Stormwater Quality Monitoring Program - Prior to commencement of operation Part of the Operational Environmental Management Plan

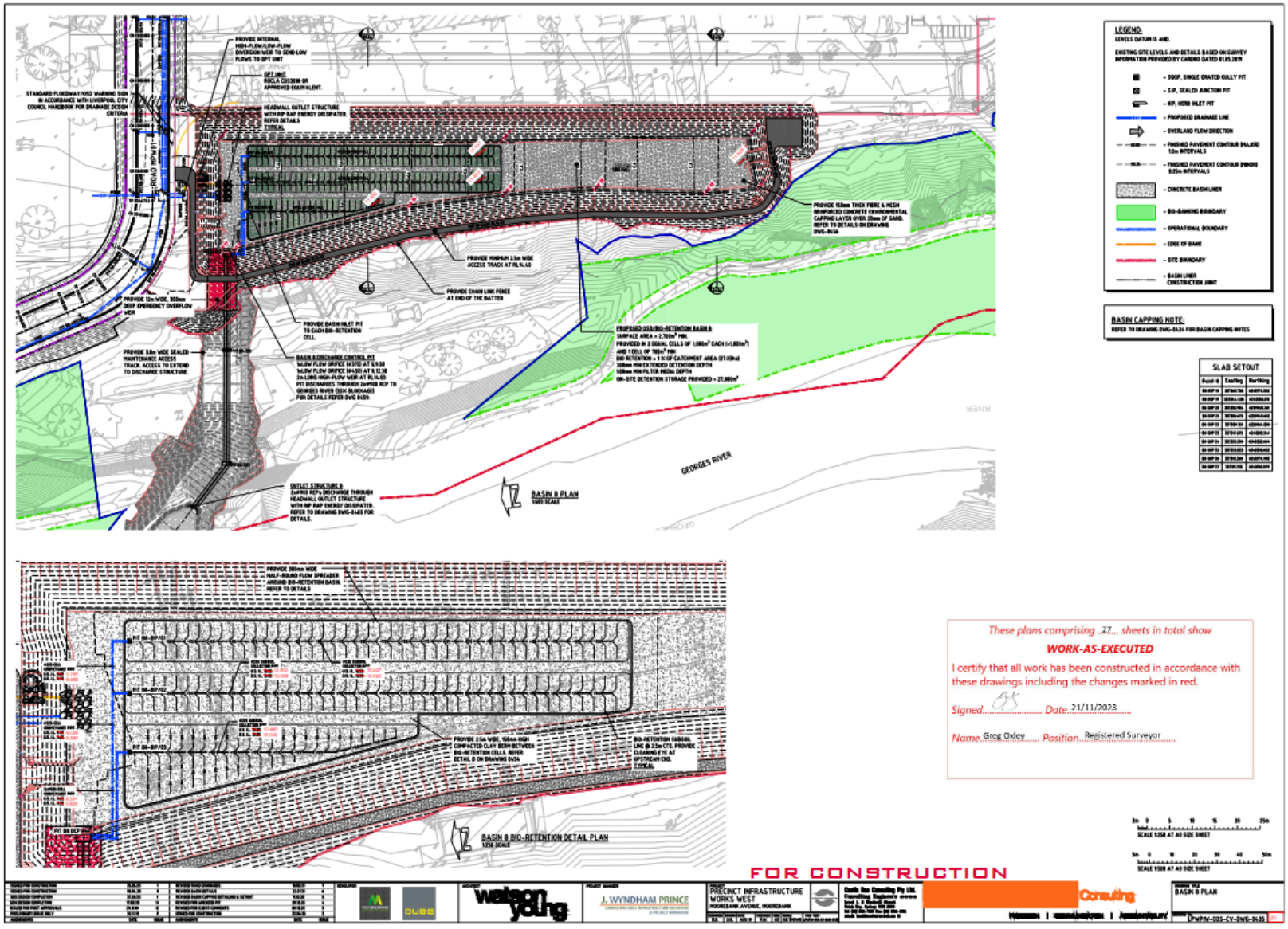
Map image 1. Overview subject site (MPW) provided by Arcadis



Map Image 2. Moorebank Precinct West Detention Basins (provided by MID Plumbing)

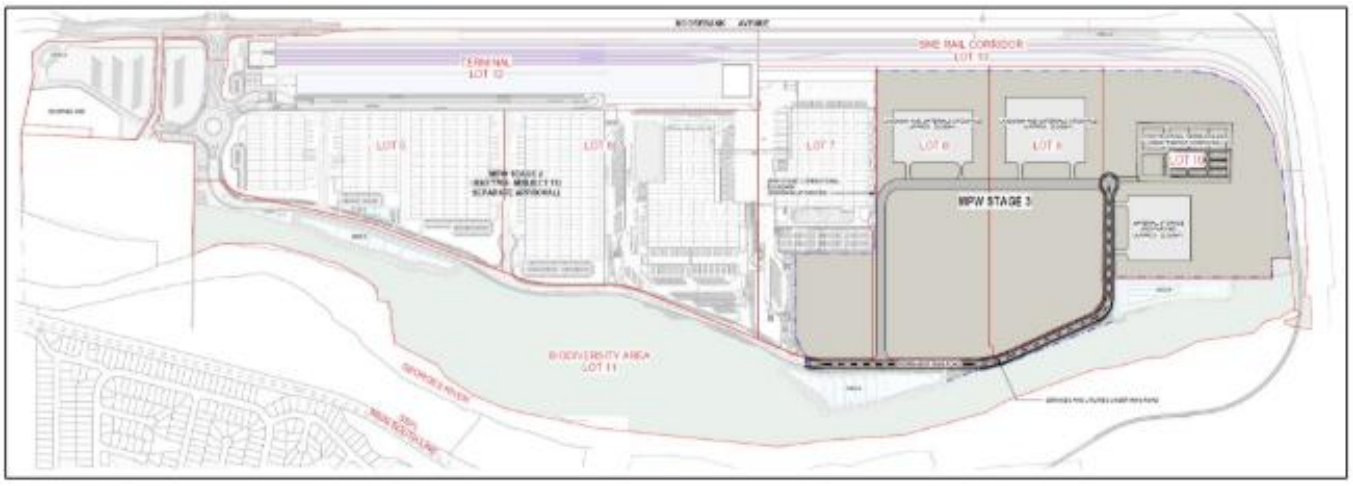


Map image 3. Detention Basin 8 MPW (south)



Reference information

Map image 4. Moorebank Intermodal Precinct West – Stage 3 State Significant Development Assessment (SSD-10431) March 2021



20. Stormwater Management System or Works	That untreated stormwater is not disposed of into the Georges River or its tributaries. The likely impact of stormwater disposal on the quality of any receiving waters. That the levels of nutrients and sediments entering the waterway are not increased by the proposed development. Whether any proposals to manage stormwater are in accordance with the local council's stormwater management plans and the Managing Urban Stormwater series of documents and meet the local council's stormwater management objectives. Whether the principles outlined in the *Managing Urban Stormwater Soils and Construction Handbook* (1998) prepared by and available from Landcom and the Department of Housing are followed during each stage of a development (including subdivision).	Detailed stormwater assessments were undertaken as part of MPW Stage 2, and remain applicable to the Stage 3 proposal. The Department has recommended conditions that would enforce these requirements, by ensuring that appropriate measures are implemented to manage stormwater impacts during construction. In regard to management of stormwater during operation of the MPW site, the MPW Stage 2 proposal incorporates a robust set of conditions to manage the release of stormwater via six onsite detention basins (OSD), a major east-west covered culvert and associated drainage infrastructure.

2. Monitoring Program Methodology

2.1 Monitoring Sites

To support stormwater and drainage management of the facility the MLP West precinct has established a vast stormwater infrastructure system consisting of several Water Sensitive Urban Design (WSUD) functions including raingardens detention basins and bio-swales. These networks are designed to minimise the velocity and peak discharge of stormwater draining from the site and act as onsite detention basins to harvest and sequester potential pollutants generated at the site through designed biological processes.

The stormwater infrastructure system discharges water into the natural drainage system via three outlets:

- Basin 5 detains water from the northern section of MPW before discharging into Georges River
- Basin 6 detains water from the mid-section of MPW before discharging into Georges River
- Basin 8 detains water from the southern section of MPW before discharging into Georges River

Monitoring of the discharge points has been established via our ongoing program with MID Plumbing under the SIOMP program to collect qualitative data and analyse the performance of the WSUD provisions and to establish any potential trends in water quality readings from the stormwater network discharge points prior to release of water into the natural hydrological systems of Anzac Creek and the Georges River.

Table 1. Type of outlet MPW

Discharge Point (see figure 2)	Associated Outlet (see figure 1)	Type of outlet/detention basin
Basin 5	Inlet	Bio retention
	Outlet	Outlet point
	Georges River	River
Basin 6	Inlet	Bio retention
	Outlet	Outlet point
Basin 8	Inlet	Bio retention
	Outlet	Outlet structure

2.2 Water Quality Assessment

Surface water quality data collected at the discharge points is assessed with reference to ANZECC Guidelines (2000) and correlated with baseline Water Quality monitoring results provided by previous condition assessment reports.

By comparing water test data under the program across the testing timeline we can identify and report upon trends, identify exceedances and exclude potential anomalies for datasets.

Table 2. ANZECC Low Risk Trigger Values

Ecosystem type	Turbidity NTU	EC µS/cm	pH*	DO	TN mg/L	NO_x - N mg/L	NH_4^+ - N mg/L	TP mg/L	DRP - P mg/L
Upland river	2-25	30-350	6.5-7.5	90-110	0.480	0.190	0.013	0.013	0.005
Lowland river	6-50	125-2200	6.5-8.0	85-110	0.500	0.190	0.020	0.050	0.020

Values for Low Land River Systems as insert above are used as the reference guide to water quality parameter values and overall health and safety statements regarding the quality of discharged water from the SIOMP drainage network.

Annual spring and autumn water quality data presented from Anzac Creek and Georges River testing programs by other scientific consultants may also be cross referenced to the data prepared by Apical under the SIOMP program to establish potential trends in results and identify increases in accumulated pollutants from the site under operational condition, which may appear present within adjacent natural waterways.

Site data was collected in the form of water samples and in field data recordings at the prescribed monitoring points, water samples and water probe readings are undertaken following Australia and New Zealand guidelines for fresh and marine water quality – 2000 (ANZECC Guidelines), In situ water quality parameters relevant to stream health and aquatic assessment profiling were collected in field with a multiparameter hand-held water quality monitoring probe (Aquatroll 600).

Water data is collected, analysed and collated under the same methodologies and process under each testing period, the ensure consistency in the process.

Measures tested and samples taken:

- pH
- Dissolved Oxygen
- Electrical Conductivity
- Water Temperature and
- Turbidity

Water samples are collected at inlet and discharge points (Basin 5, Basin 6 & Basin 8) then sent to Australian Laboratory Services (ALS) for quality testing analysis Surface water (alsglobal.com).

Water analytical suites / testing parameters are provided to obtain overall water condition results and chemical sampling of collected water is undertaken for a range of nutrients, metals, and hydrocarbons relevant to stream health and aquatic assessment protocol, key nutrients, metals, and pollutants included in the assessment to reflect an overall suite of water quality condition guides which are listed below:

- Total phosphorous
- Total Nitrogen
- Kjeldahl Nitrogen
- Dissolved Metals
- PFAS
- Total Suspended Solids
- Total Hydrocarbons

The raw data results from the lab analysis provided to us by ALS Laboratory Services are presented within this report (see Appendix A).

Key water quality data attributes are recorded, tables and compared against; previous condition baseline data, Liverpool Development Control Plan (DCP) water quality targets, Conditions of Consent B40 and ANZECC Guideline (2000) trigger limits under the condition category -(90% protection criteria for freshwater natural systems).

The water quality guidelines are applied to ensure adjacent natural waterways George River and Anzac creek are not adversely affected by poor water quality discharge from the Moorebank logistics park site and operations.

Trends observed in our datasets are analysed on a temporal scale with any trigger values for specific water quality measures highlighted and presented within the results chapter of each seasonal report. This report provides baseline data and Spring 2025 data for Basin 8 (MPW) from which trend analysis will compound over future reporting periods.

2.3 Data Analysis

The water quality measurements collected are used to assess water quality at each site in terms of health of aquatic ecosystems by comparison with guideline values recommended by the ANZECC and ARMCANZ (2000) guidelines for the protection of lowland streams (i.e. systems at < 150 m altitude) in south-east Australia. This categorisation for stream health is deemed relevant for the description of Anzac Creek, the recipient natural way due to the location in the geomorphic landscape and correlations of expected biophysical health and habitat profiles for similar stream environments.

2.4 Survey dates and personnel

On the 9th April 2025, ecologists from Apical Bushfire and Planning attended Moorebank Precinct West (MPW) to collect water quality data across the testing sites which are located within selected inlet points and discharge points within the stormwater drainage and management system (SIOMP) located within the Moorebank Logistics Park site West (See map image 2).

Inlet and outlet points within the network are representative of variant sites where stormwater will enter a node of the system (as a point source) and then release from the that node of the system at a discharge point. By recording inlet and discharge data water quality can be tracked along the continuum within the system to determine condition changes and overall trends in measured quality at given sites.

This data was collected on behalf of MID plumbing in accordance with 'The Stormwater Infrastructure Operation and Maintenance Plan Moorebank Logistics Park – West Precinct 2020' and in compliance with Condition of Consent B40 (Liverpool City) for the subject site. The results of such monitoring data collection are presented within this report.

2.5 Rainfall

Between the 1st of March and the 31st of March 2025 Moorebank received 90.2mm of rainfall (http://www.bom.gov.au/climate/dwo/202409/html/IDCJDW2161.202409.shtml). Between the 1st of April and the 15h of April 2025 Moorebank received 3.4mm of rainfall.

Figure 1. Bureau of Meteorology Daily Weather Observation Holsworthy March 2025

		Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
Date	Day	Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Sa	18.7	32.0	0			S	28	23:13	22.9	78		WSW	13	1016.7	31.2	53		ENE	15	1012.3
2	Su	19.8	25.7	0			S	52	16:16	23.5	85	8	SSE	19	1013.7	24.8	75	8	SE	30	1013.1
3	Mo	19.2	25.6	0			S	37	08:09	22.2	71	3	S	22	1018.7	24.3	63	8	S	22	1017.6
4	Tu	18.5	26.0	6.8			S	46	15:00	21.0	94	8	SE	9	1021.3	24.2	70	8	SSE	26	1021.6
5	We	18.5	26.7	3.2			SE	35	15:06	22.3	74		SSE	15	1021.8	25.3	55	6	SE	22	1019.5
6	Th	16.9	26.9	0			SSE	43	15:50	21.9	81	8	SSE	15	1020.4	25.4	62	7	SE	22	1019.9
7	Fr	17.9	26.5	2.4			ESE	44	12:59	19.9	92	8	SSE	15	1021.6	25.6	55	5	ESE	24	1020.5
8	Sa	17.4	24.5	2.6			SE	33	12:14	21.1	87	7	SSE	17	1022.8	23.2	70	8	ENE	15	1022.5
9	Su	19.8	28.5	1.4						21.8	94	8		Calm	1023.7	27.0	55	2	ENE	19	1020.7
10	Mo	18.5	27.1				NNE	24	13:12	22.9	79	8	NNE	7	1020.8	26.1	60	8	NNE	13	1018.6
11	Tu	19.4	22.3	9.0			SE	30	06:14	20.2	97	7	SSE	15	1020.5	21.4	93	8	ESE	17	1020.6
12	We	18.6	27.0	8.0			SE	22	13:50	20.4	94	6	W	9	1022.8	26.8	63	8	ENE	7	1019.8
13	Th	17.0	31.7	0			N	24	10:29	19.8	97	7	W	7	1020.1	30.5	48		NNW	9	1016.8
14	Fr	17.8	35.8	0			SSE	30	22:56	23.1	90			Calm	1019.5	34.3	36		NE	9	1016.3
15	Sa	22.0	34.7	0			SE	30	23:09	23.6	85	8	W	7	1019.9	34.5	45		NE	11	1014.5
16	Su	21.0	37.0	0			W	39	12:21	25.6	67		W	6	1011.6	36.4	26		WNW	20	1006.7
17	Mo	15.5	21.5	0			SSE	61	01:54	18.0	51		SSW	20	1018.9	20.5	39		SE	28	1020.8
18	Tu	10.9	24.4	0			E	28	10:42	16.0	71			Calm	1024.5	23.1	51	8	ESE	17	1022.4
19	We	15.6	28.6	0			E	31	14:05	19.3	80	1		Calm	1023.3	27.3	54		ESE	20	1019.0
20	Th	18.2	32.5	0			ENE	31	17:41	22.1	81	1		Calm	1020.3	31.3	47		E	17	1015.6
21	Fr	17.9	27.5	0			SSE	31	18:36	20.1	90	8	W	7	1014.5	25.9	68	3	N	13	1012.5
22	Sa	18.9	26.7	1.4			SE	31	16:27	19.8	87	7	W	6	1017.6	25.1	63	8	SE	17	1015.9
23	Su	19.7	22.1	4.0			S	26	12:46	20.4	92	8	S	13	1021.1	21.0	88	8	S	15	1019.8
24	Mo	18.8	25.8	3.6						20.3	97	8	S	2	1020.3	24.2	71	7	ESE	9	1018.9
25	Tu	19.6	26.2				SSE	31	12:01	22.6	82	4	S	13	1023.1	23.4	82	8	SSW	11	1021.2
26	We	18.4	27.5	1.0			E	33	16:13	19.8	97	1		Calm	1022.6	26.8	54		E	17	1020.5
27	Th	15.6	25.7	0			S	28	10:22	18.4	94	1		Calm	1023.4	24.6	74	8	SE	17	1022.1
28	Fr	16.7	24.2	1.4			E	30	13:28	19.9	96	8		Calm	1022.6	23.8	74	8	E	15	1019.7
29	Sa	18.0	22.0	19.0			SW	37	21:32	18.6	96	7	SSW	7	1012.6	20.0	95	7	WSW	11	1007.3
30	Su	18.4	24.2	11.8			S	50	14:42	19.4	91	8	WSW	13	1008.1	22.1	79	8	SSW	31	1008.1
31	Mo	17.4	24.3	14.6			SW	54	13:19	19.5	79	6	SW	17	1011.7	22.6	64	8	SSW	26	1011.7
Statistics for March 2025																					
Mean		18.1	27.1							20.9	85	6		8	1019.4	25.9	62	7		17	1017.3
Lowest		10.9	21.5	0						16.0	51	1		Calm	1008.1	20.0	26	2	ENE	7	1006.7
Highest		22.0	37.0	19.0			SSE	61		25.6	97	8	S	22	1024.5	36.4	95	8	SSW	31	1022.5
Total				90.2																	

IDCJDW2161.202503 Prepared at 13:00 UTC on Monday 14 April 2025

Figure 2. Bureau of Meteorology Daily Weather Observation Holsworthy April 2025

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Tu	15.6	23.2	0			S	37	10:56	19.2	73	5	WSW	9	1015.2	22.1	55	5	SSW	20	1013.3
2	We	13.0	24.6	0			E	28	16:07	14.3	82	7	WSW	9	1012.4	23.9	41		NE	11	1007.8
3	Th	10.1	26.7	0			WNW	39	11:44	14.1	94		Calm		1011.3	25.9	26		SW	9	1009.7
4	Fr	12.3	25.3	0			SE	31	15:50	16.9	86		WSW	7	1016.4	24.6	58	3	SE	15	1014.4
5	Sa	14.3	26.2	0			SE	39	16:24	18.5	47		WNW	9	1015.0	25.0	31		SE	19	1013.9
6	Su	9.2	25.3	0			W	26	11:47	17.1	75		NW	9	1018.8	23.6	31	8	S	6	1013.9
7	Mo	11.5	26.9	0			WSW	43	12:01	19.8	50		NW	11	1018.1	26.7	27		W	11	1015.9
8	Tu	12.3	22.2	0			SE	28	15:34	18.0	71	7	W	9	1025.2	21.4	60	8	SE	19	1023.1
9	We	15.5	24.0	1.2			E	28	13:17	19.7	80	5	ENE	7	1025.7	22.1	69	1	ENE	19	1021.4
10	Th	12.4	24.2	0			NNE	17	14:07	17.7	89	8	Calm		1023.2	23.7	59	8	ENE	7	1020.0
11	Fr	12.4	30.1	0			SE	37	14:37	20.0	76		WNW	9	1023.9	26.7	48	2	SE	20	1022.8
12	Sa	15.1	26.4	0			SSE	28	13:10	21.7	74		WNW	6	1030.8	24.9	64	1	E	17	1028.9
13	Su	13.2	26.8	0			ENE	28	16:05	20.5	85		W	7	1030.2	25.5	51		ENE	17	1025.9
14	Mo	12.4	28.8	0			S	57	14:47	18.8	86		WSW	9	1025.6	24.4	61		S	26	1023.6
15	Tu	16.2		2.2						19.4	75	8	SSW	15	1027.7	19.3	72	8	SSE	19	1025.5
Statistics for the first 15 days of April 2025																					
Mean		13.0	25.8							18.4	76	6		7	1021.3	24.0	50	4		15	1018.7
Lowest		9.2	22.2	0						14.1	47	5	Calm		1011.3	19.3	26	1	S	6	1007.8
Highest		16.2	30.1	2.2			S	57		21.7	94	8	SSW	15	1030.8	26.7	72	8	S	26	1028.9
Total				3.4																	

IDCJDW2161.202504 Prepared at 05:36 UTC on Tuesday 15 April 2025

3. Results

Data results captured by our water quality sampling are presented herein and are representative of baseline & Spring (2024) water quality results for Moorebank Precinct West Basin 8. Threshold guideline quantitative values for the water quality parameter themes are compared and correlated to ANZECC/ARMCANZ (2000) guidelines under the categorisation thresholds – Waterway benchmark group: 'The protection of slightly disturbed lowland river ecosystems in southeast Australia'.

As these are the first samples results collected under our scope for the SIOMP-MPW sites, the sampling results presented in this report will be considered for future analysis against subsequent results for use as baseline data for the drainage network SIOMP function.

Triggers Exceedances from both the In-Situ Data and the Laboratory Samples April 2025

Location Basin 8 Outflow

Phosphorous 40 µg/L (Guideline trigger 25 µg/L)

Nitrogen 400 µg/L (Guideline trigger 350)

Literature Review

Phosphorous Values

Phosphorus

Stormwater runoff is a major cause of physical, chemical (i.e. nutrients), and microbial degradation of receiving waters. Nitrogen (N) and phosphorus (P) are of particular concern and interest in urban stormwater runoff due to their role in eutrophication of water bodies, onset of harmful algal blooms, and fish kills. refer (Yun-Ya Yang & Gurpal S. Toor)

The linkages between urbanization and increased N and P export is well established; however, the contributions and dynamics of N and P are often site-specific, the synchronicity between N and P in aquatic environment has been widely used as an ecological indicator of biological growth and nutrient limitation.

Understanding P dynamics in stormwater runoff can help to implement and enhance the effectiveness of strategies to control P loss and transport to receiving waters.

P values from this testing period were slightly raised above the ANZECC guidelines, however are considered reasonable for the testing environment and sample pool.

Nitrogen Values

Nitrogen

A previous spike in Nitrogen has decreased to almost meet the ANZECC trigger value for rivers flowing to the coast at this collection point. This may be due to increased vegetation within the system allowing for uptake of excess nitrogen being mobilised by the stormwater.

Nitrogen values are above the guideline rates, however this is a reduction in concentration when compared to the samples of October 2024, which provides an improvement in nitrogen concentration.

Five (5) Industrial Applications of Nitrogen

While the main industrial use of nitrogen is to create ammonia that is required for fertilizer, explosives, and other materials, it uses go far beyond these applications. From food packaging to pharmaceuticals, nitrogen gas can be found in more places and used for more purposes than you may have realized.

Food Packaging: It is common practice for food processing companies to use compressed nitrogen to displace oxygen in the packaging of perishable foods. Without oxygen, the shelf life of foods such as meats, fruits, vegetables, and various snack foods can be extended. Nitrogen can also add a cushion around food to keep it safe during transport.

Chemical Blanketing: Nitrogen is typically used to prevent fires and explosions in dangerous atmospheres like chemical plants or manufacturing facilities, by lowering the oxygen level below explosive limits.

Electronics: In the process of assembling electronics, nitrogen gas is used when two electronic components are forming a permanent connection, also known as soldering. The gas is used to reduce surface tension so there is a cleaner break away from the site of the electrical bond. Nitrogen gas is also used in a computer's main processing system to prevent it from overheating.

Laboratory: Laboratories require a very specific environment to ensure that tests and results are carried out accurately. Nitrogen gas is used to control oxygen levels, humidity and temperature, and maintain an appropriate atmosphere for highly sensitive procedures and equipment. Additionally, there are various pieces of laboratory equipment that require nitrogen for purging.

Laser Cutting: The application of nitrogen as a purging gas in the steel industry is extremely important. It is used as an assist gas to blow away molten material and achieve a stronger stainless or aluminized steel product that is also more resistant to corrosion.

https://nigen.com/industries-that-benefit-from-on-site-nitrogen-systems/

Industries That Benefit from On-Site Nitrogen Systems

Gaseous nitrogen is very useful in large-scale manufacturing and industrial applications. The large volumes of nitrogen gas required for these operations are either sourced from vendors in gas cylinders or generated on-site. In this article, we will highlight critical industrial processes that benefit from on-site nitrogen systems.

3.2 Interpreting Results

Dissolved Oxygen – Measures:

Dissolved oxygen (DO) is oxygen held (dissolved) in the water and available to aquatic organisms.

The amount of dissolved oxygen in a river or stream can tell us a lot about its water quality.

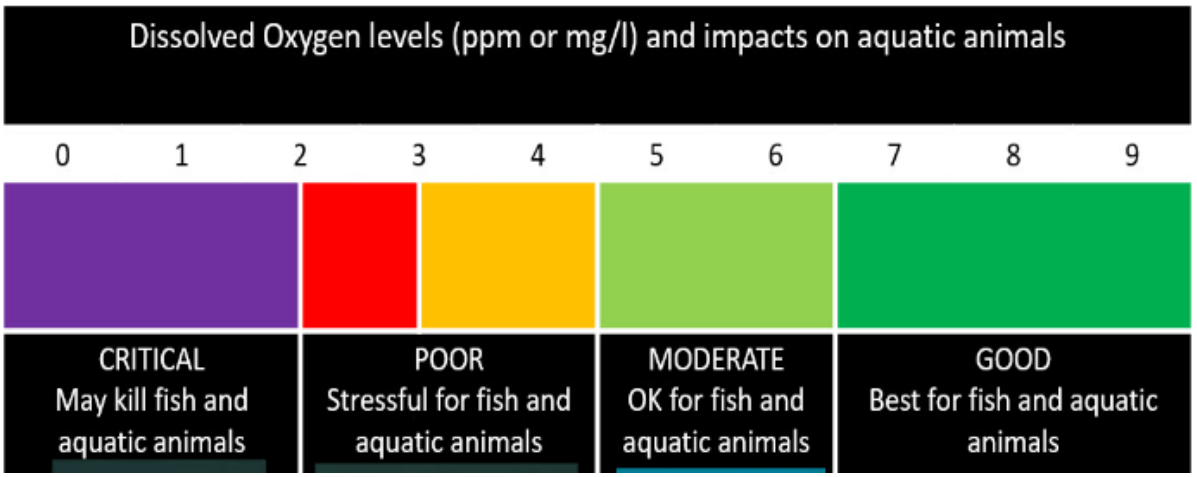
Water will naturally contain a certain amount of dissolved oxygen that is absorbed from the air and produced by plants and algae living in the water.

Temperature has a large effect on the amount of oxygen dissolved in water; cold water can hold higher levels of oxygen than warmer water. Higher water temperatures over summer will cause oxygen levels to drop.

Other factors such as river flow, wind, nutrients and bacterial activity can also affect the amount of dissolved oxygen in waterways.

Dissolved oxygen levels typically range between 5 and 14 mg/L (or ppm).

Example:



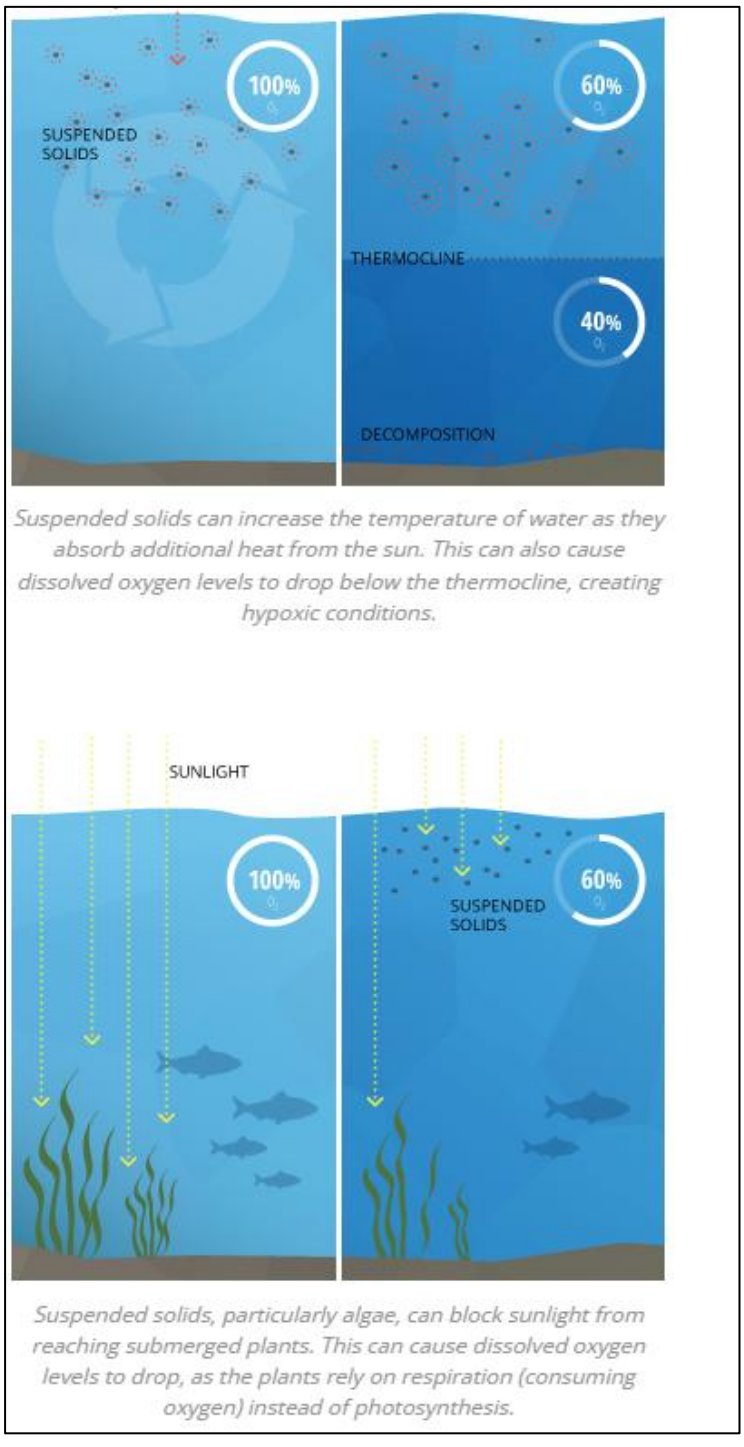
Salinity – Measures:

Electrical conductivity is a measure of the saltiness of the water and is measured on a scale from 0 to 50,000 uS/cm. Electrical conductivity is measured in microsiemens per centimeter (uS/cm). Freshwater is usually between 0 and 1,500 uS/cm and typical sea water has a conductivity value of about 50,000 uS/cm.
Examples:

µS/cm	Use
0 - 800	• Good drinking water for humans (provided there is no organic pollution and not too much suspended clay material) • Generally good for irrigation, though above 300µS/cm some care must be, particularly with overhead sprinklers, which may cause leaf, scorch on some salt sensitive plants. • Suitable for all livestock
800 - 2500	• Can be consumed by humans, although most would prefer water in the lower half of this range if available • When used for irrigation, requires special management including suitable soils, good drainage and consideration of salt tolerance of plants • Suitable for all livestock
2500 -10,000	• Not recommended for human consumption, although water up to 3000 µS/cm can be consumed • Not normally suitable for irrigation, although water up to 6000 µS/cm can be used on very salt tolerant crops with very special management techniques. Over 6000 µS/cm, occasional emergency may be possible with care • When used for drinking water by poultry and pigs, the salinity should be limited to about 6000 µS/cm. Most other livestock can use water up to 10000 µS/cm

Total Dissolve Solids (TDS) – Measures

Dissolved solids, smaller than 2 microns, refer to any minerals, salts, metals, in the form of molecules, atoms, cations or anions dissolved in water. Total dissolved solids (TDS) comprise inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates) and some small amounts of organic matter that dissolve in water.
The TDS concentration is the sum of all filterable substances in water that can be determined gravimetrically. However, in most cases, TDS is primarily comprised of ions.
High levels of total suspended solids can affect turbidity, increase water temperatures and decrease dissolved oxygen (DO) levels. This can cause the water to heat up more rapidly because the suspended particles absorb more heat and deplete oxygen, which can adversely affect aquatic life.

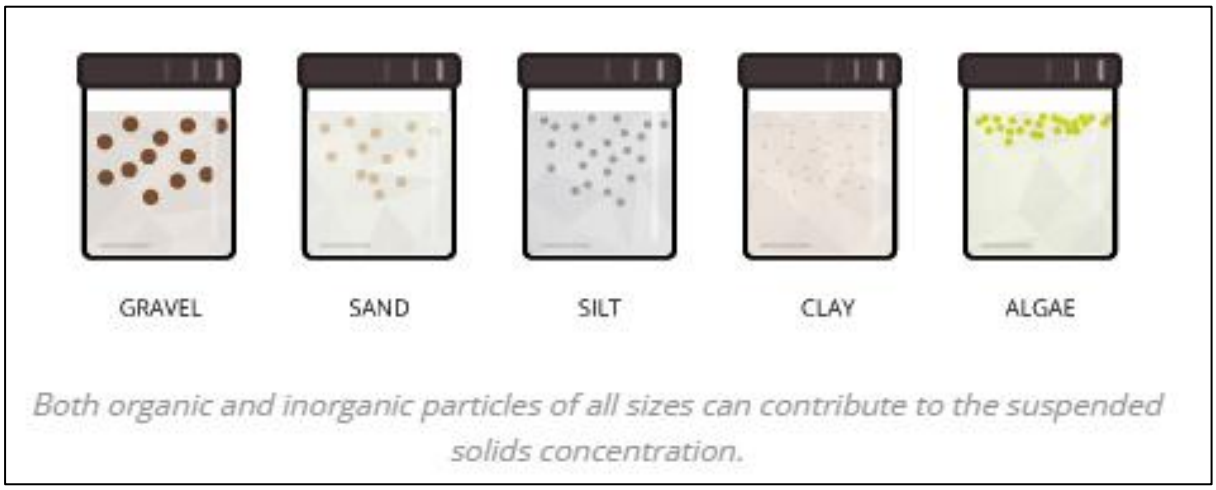


Suspended solids can increase the temperature of water as they absorb additional heat from the sun. This can also cause dissolved oxygen levels to drop below the thermocline, creating hypoxic conditions.

Suspended solids, particularly algae, can block sunlight from reaching submerged plants. This can cause dissolved oxygen levels to drop, as the plants rely on respiration (consuming oxygen) instead of photosynthesis.

Turbidity – Total Suspended Solids (TSS)

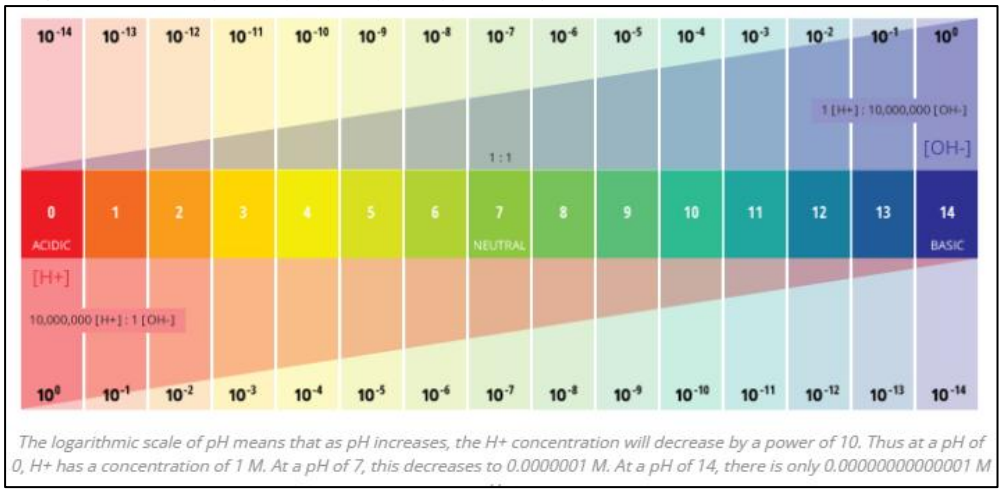
Turbidity data are reported in Nephelometric Turbidity Units (NTU). To provide a sense of scale, water with a turbidity of 1 NTU is crystal clear, water at 5 NTU has a tiny trace of discolouration, and water at 100 NTU is brown and opaque. The standard is less than 10 NTU for rural streams and rivers and less than 30 NTU for urban lakes and ponds.
Total suspended solids (TSS) are particles that are larger than 2 microns found in the water column. Anything smaller than 2 microns (average filter size) is considered a dissolved solid. Most suspended solids are made up of inorganic materials, though bacteria and algae can also contribute to the total solids concentration.



Both organic and inorganic particles of all sizes can contribute to the suspended solids concentration.

pH – Acidity / Alkalinity – Measures

The pH refers to the degree of acidity or alkalinity of a substance. A pH of 7 is neutral. A value above 7 indicates that the water is more alkaline and a pH below 7 indicates acidic conditions.
A pH of 7 is considered neutral. The logarithmic scale means that each number below 7 is 10 times more acidic than the previous number when counting down. Likewise, when counting up above 7, each number is 10 times more basic than the previous number pH stands for the "power of hydrogen" [3]. The numerical value of pH is determined by the molar concentration of hydrogen ions (H+) [3]. This is done by taking the negative logarithm of the H+ concentration (-log(H+)).
Standard values for pH readings are expected, pH 6.5–9 for rural streams and rivers and pH 6–9 for urban lakes and ponds.
In freshwater systems pH sets up the conditions for how easy it is for nutrients to be available and how easily things like heavy metals (toxicity for aquatic life) can dissolve in the water. Rivers and lakes generally range between 5 (acidic) and 9 (basic) on the pH scale.



The logarithmic scale of pH means that as pH increases, the H+ concentration will decrease by a power of 10. Thus at a pH of 0, H+ has a concentration of 1 M. At a pH of 7, this decreases to 0.0000001 M. At a pH of 14, there is only 0.00000000000001 M

Summary of Results

Aquatic ecosystems	
Indicator	**Numerical criteria (trigger values)**
Total phosphorus 40 µg/L	Upland rivers: 20 µg/L Lowland rivers: 25 µg/L for rivers flowing to the coast; Lakes & reservoirs: 10 µg/L Estuaries: 30 µg/L
Total nitrogen 400 µg/L	Upland rivers: 250 µg/L Lowland rivers: 350 µg/L for rivers flowing to the coast; Lakes & reservoirs: 350 µg/L Estuaries: 300µg/L
Chlorophyll-a	Upland rivers: not applicable Lowland rivers: 5 µg/L Lakes & reservoirs: 5 µg/L. Estuaries: 4 µg/L.
Turbidity 28.72 NTU	Upland rivers: 2–25 NTU (see supporting information) Lowland rivers: 6–50 NTU (see supporting information) Lakes & reservoirs: 1–20 NTU Estuaries: 0.5–10 NTU
Salinity (electrical conductivity) 282.3 µS/cm	Upland rivers: 30–350 µS/cm Lowland rivers: 125–2200 µS/cm supporting information
Dissolved oxygen 9.09 ppm	Upland rivers: 90–110% Lowland rivers: 85–110% Freshwater lakes & reservoirs: 90–110% Estuaries: 80–110% Note: Dissolved oxygen values were derived from daytime measurements. Dissolved oxygen concentrations may vary diurnally and with depth. Monitoring programs should assess this potential variability.
pH 8.12	Upland rivers: 6.5–8.0 Lowland rivers: 6.5–8.5 Freshwater lakes & reservoirs: 6.5–8.0 Estuaries: 7.0–8.5 Changes of more than 0.5 pH units from the natural seasonal maximum or minimum should be investigated.

3.1 Key Summary of Results Autumn 2025

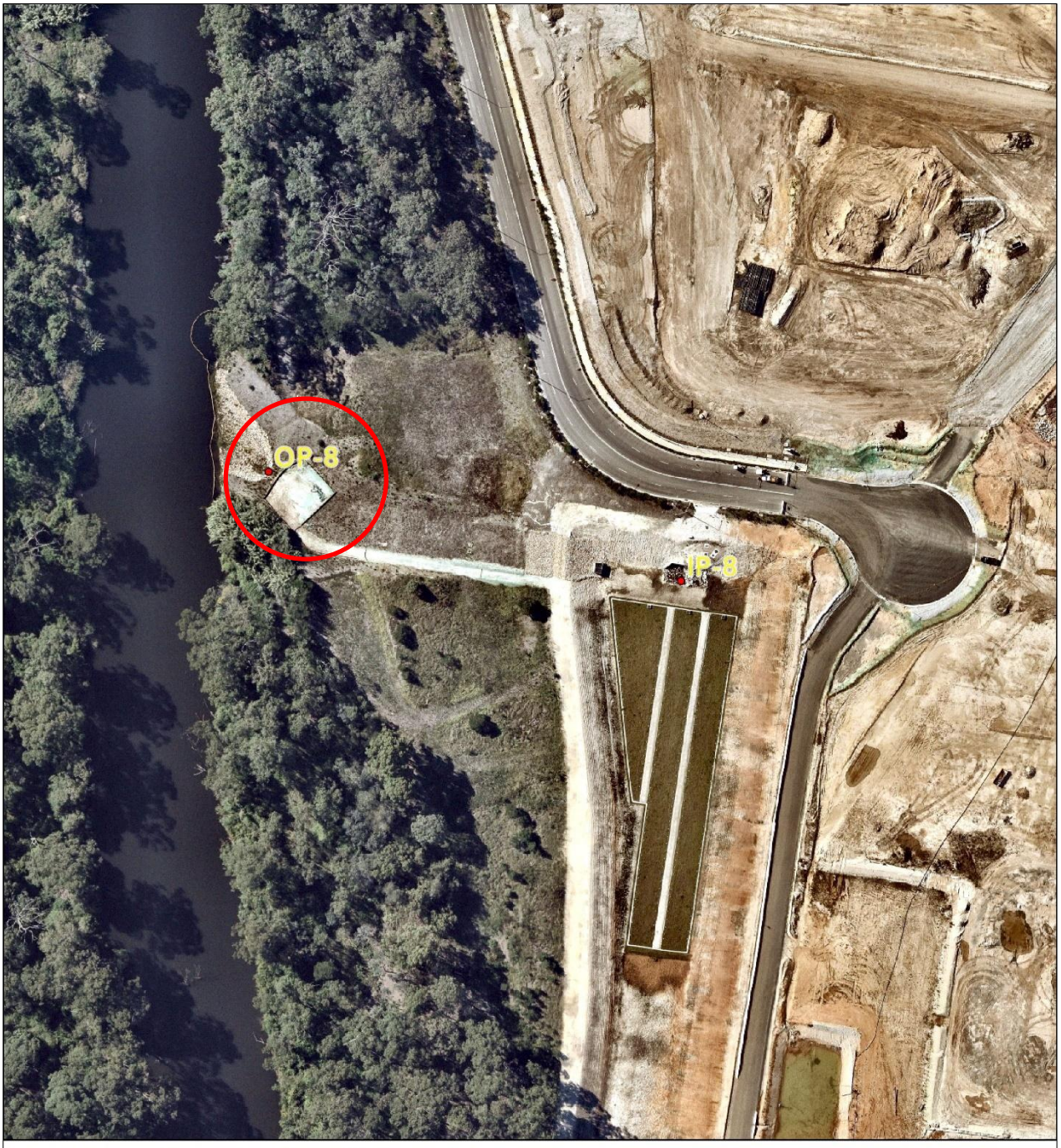
Both Nitrogen and phosphorous trigger the Anzecc guideline within the water samples from basin 8. These values are showing improvement from previous testing periods. This may be due to increased vegetation within the bio-swale.

pH has increase significantly at basin 8 (6.44 to 8.12). The pH values sit within a reasonable range for lowland rivers, however this value will continue to be monitored during future testing periods.

3.2 Recommendations

Nitrogen, phosphorous and pH will continue to be monitored across future testing periods.

Map Image 5. Stormwater Testing Site – Moorebank Logistics Park



Sample Site Map

0 30 60 120 Meters

Client: M.I.D Plumbing	Map Issue: Basin 8 Sample Site Map
Address: BUSHMASTER AVENUE MOOREBANK2170	Time: 10/07/2024 2:25 PM

LGA: LIVERPOOL CITY COUNCIL	Scale: 1:2,000
Lot/DP: 5 to 14/DP 1299137	Spatial Reference: WGS 1984 Web Mercator Auxiliary Sphere
Units: Meters	

Marco Perry
Environmental/Bushfire Planner
Bsc EnvSc

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STORMWATER DISCHARGE TESTING SITE

BASIN 8 – OUTFLOW

Site image 1. Testing site Basin 8 - Outflow

Table 3. In-situ data and observations Retention Basin 8 outflow

Moorebank West Precinct - Retention Basin 8 Outflow (MPW 5 outflow)			
Date: 09/04/2025	**Time:** 01:13pm	**Temp:** 21°C	**Humidity**: 80%
Operator: Marco Perry		**Coordinates:** -33.947085, 150.917653	
Equipment used: Aquatroll 500			
Parameter	**Recording**	**ANZECC** ANZECC 2000 Guidelines *Lowland rivers	**Triggered?** Y/N
Temperature (Celcius)	21.5	Abnormal to seasonal variation	N
Dissolved Oxygen (DO ppm)	9.09ppm	*Lowland rivers Lower limit: 85% Upper Limit: 110%	N
Electrical Conductivity ($C^{-um/cm}$)	282.3 ($C^{-us/cm}$)	125–2200 µS/cm	N
pH	8.12	Min 6.5 Max 8.5	N
NTU	28.72 NTU	6-50	N

(a) Total phosphorus

Basin 8. - Total phosphorous – Qube Logistics, Moorebank, NSW		Trigger Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results - Total phosphorous:	40 µg/L	25 µg/L - 50 µg/L	N
Notes: • Channel Culvert • Trigger value 50 µg/L for lowland rivers, trigger value 25 µg/L for rivers flowing to the coast Anzecc Guidelines 2000.			

(b) Total Nitrogen as N (TKN + NOx) by Discrete Analyser

Basin 8.1 inflow - Total nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results -Total nitrogen:	400 µg/L	350 µg/L for rivers flowing to the coast	Y
Notes: • Total Nitrogen as N (TKN + NOx) by Discrete Analyser • Trigger values are based on a low-lying river			

(c) Kjeldahl nitrogen Total Kjeldahl Nitrogen as N

Basin 8.1 inflow - Kjeldahl nitrogen – Qube Logistics, Moorebank, NSW		Trigger Value - ANZECC 2000 Guidelines	Triggered
Lab results – kjeldahl nitrogen:	400 µg/L	-	-
Notes: • Total Kjeldahl Nitrogen as N			

(d) Dissolved metals;

Basin 8.1 inflow - Dissolved metals – Qube Logistics, Moorebank, NSW			
Equipment used: - Sample bottles collected from monitoring site ALS Environmental Laboratory Testing Report			
Lab results – Dissolved metals:	**Measures mg/L**	**Trigger value ANZECC Guidelines 2000 95% protection criteria**	**Triggered**
Arsenic	<0.001	0.013 mg/L	N
Cadmium	<0.0001	0.0002 mg/L	N
Chromium	<0.001	0.001 mg/L	N
Copper	<0.001	0.0014mg/L	N
Nickel	<0.001	0.011 mg/L	N
Lead	<0.001	0.0034 mg/L	N
Zinc	<0.005	0.008 mg/L	N
Mercury	<0.0001	0.0006 mg/L	N
Notes: - ANZECC Guidelines (2000) suggest 0.002 mg/L is considered appropriate for slightly-moderately disturbed systems. - A spike in cadmium and zinc observed from past WQM has decreased and no longer triggers ANZECC Guidelines 90% protection criteria.			

(e) PFAS;

Basin 8.1 inflow - PFAS – Qube Logistics, Moorebank, NSW			
PFAS Surrogate	**Measure** µg/L	**95% species protection (DEE 2016)**	**Triggered**
Sum of PFAS **13C4-PFOS**	0.01µg/L 102%	.13 (µg/L)	N
Sum of PFHxS and PFOS **13C8-PFOA**	0.01µg/L 101%	220 (µg/L)	N
Notes: This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include: • Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation. • PFOS and PFOA can also be the breakdown endpoint of other precursor products. • PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife. • Information on other PFASs, of which there are several hundred known, is more limited. • Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present. * DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.			

(f) Total suspended solids.

Basin 8.1 inflow - Total suspended solids – Qube Logistics, Moorebank, NSW		EPA exceedance value	Trigger
Lab results – Total suspended solids: mg/L	13 mg/L	50 mg/L	N
Notes: • Total Suspended Solids dried at 104 ± 2°C • Total Suspended Solids (TSS)			

(g) Total hydrocarbons

Basin 8.1 inflow - Total hydrocarbons – Qube Logistics, Moorebank, NSW

Total Hydrocarbons assessed alongside baseline data (2018) and Autumn monitoring (2019) for Aquatic Monitoring location 11&12 (AQ11 & AQ12 Anzac Creek).

Lab results -Total hydrocarbons:	Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem	Triggered	Monitoring discharge points May 2024 (Apical)	Monitoring discharge points October 2024 (Apical)	Monitoring discharge points April 2025 (Apical)		Trend
Benzene µg/L	1300 µg/L	N	<1	<1	<1		No trend
Toluene µg/L	-	N	<2	<2	<2		No trend
Ethylbenzene µg/L	-	N	<2	<2	<2		No trend
meta-& para-Xylene µg/L	200 µg/L	N	<2	<2	<2		No trend
Ortho-Xylene µg/L	470 µg/L	N	<2	<2	<2		No trend
Total Xylenes µg/L	-	-	<2	<2	<2		No trend
Sum of BTEX µg/L	-	-	<1	<1	<1		No trend
Naphthalene µg/L	85 µg/L	N	<5	<5	<5		No trend

Notes:

- The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.
- A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX

Water Quality Monitoring Comparative Table (Temporal)

Table 4. Retention Basin 8 MPW. Testing Site OP-8

Testing Site MPW 8.1 Inflow		May 2024	October 2024	April 2025
pH		8.51	6.44	8.12
Dissolved Oxygen - %/L		13.07 mg/L	10.5 ppm	9.09 ppm
Actual Electronic Conductivity (SPC -ms/cm)		0.558 SPC - ms/cm	8.3 (C-ms/cm)	282.3
Temperature - ℃		15.5	19.3	21.5
Turbidity		5.39 NTU	6.80 NTU	28.72 NTU
Total phosphorous - mg/L		0.06 mg/L	0.05 mg/L	0.04 mg/L
Total nitrogen - mg/L		0.07 mg/L	0.8 mg/L	0.4 mg/L
Kjeldahl nitrogen mg/L		0.07 mg/L	0.7 mg/L	0.4 mg/L
Dissolved metals				
Arsenic		<0.001	<0.001	<0.001
Cadmium		<0.0001	<0.0001	<0.0001
Chromium		<0.001	<0.001	<0.001
Copper		0.002	<0.001	<0.001
Nickel		0.001	0.001	<0.001
Lead		<0.001	<0.001	<0.001
Zinc		<0.005	<0.005	<0.005
Mercury		<0.0001	<0.0001	<0.0001
PFAS				
Lab results – SUM of PFAS Micrograms/L		0.04	0.69	0.01
SUM of PFHxS & PFOS Microgrms/L		0.04	0.56	0.01
Total suspended solids mg/L		<5	<5	13
Total hydrocarbons				
Benzene	<1	<1	<1	<1
Toluene	<2	<2	<2	<2
Ethylbenzene	<2	<2	<2	<2
meta-& para-Xylene	<2	<2	<2	<2
Ortho-Xylene	<2	<2	<2	<2
Total Xylenes	<2	<2	<2	<2
Sum of BTEX	<1	<1	<1	<1
Naphthalene	<5	<5	<5	<5

Appendix A. Raw data tables; source - Australian Laboratory Services

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	WMP8	WMP7	WMP5	----	----
				Sampling date / time	09-Apr-2025 13:10	09-Apr-2025 12:50	09-Apr-2025 12:30	----	----
Compound	CAS Number	LOR	Unit		EW2501914-006	EW2501914-007	EW2501914-008	--------	--------
					Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	<100	<100	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	<100	<100	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	----	----
^ **Total Xylenes**	----	2	µg/L		<2	<2	<2	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	**0.11**	<0.02	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.01**	**0.13**	**0.01**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	WMP8	WMP7	WMP5	----	----
				Sampling date / time	09-Apr-2025 13:10	09-Apr-2025 12:50	09-Apr-2025 12:30	----	----
Compound	CAS Number	LOR	Unit		EW2501914-006	EW2501914-007	EW2501914-008	--------	--------
					Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	**0.04**	**0.03**	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	**0.04**	**0.03**	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	**0.01**	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	----	----
Perfluorohexadecanoic acid (PFHxDA)	67905-19-5	0.05	µg/L		<0.05	<0.05	<0.05	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	WMP8	WMP7	WMP5	-----	-----
				Sampling date / time	09-Apr-2025 13:10	09-Apr-2025 12:50	09-Apr-2025 12:30	-----	-----
Compound	CAS Number	LOR	Unit		EW2501914-006	EW2501914-007	EW2501914-008	-----	-----
					Result	Result	Result	-----	-----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	-----	-----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	-----	-----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	-----	-----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	-----	-----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	-----	-----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	-----	-----
EP231P: PFAS Sums									
Sum of PFAS	-----	0.01	µg/L		**0.01**	**0.32**	**0.08**	-----	-----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.01**	**0.24**	**0.01**	-----	-----
Sum of PFAS (WA DER List)	-----	0.01	µg/L		**0.01**	**0.32**	**0.08**	-----	-----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**98.8**	**90.8**	**88.8**	-----	-----
Toluene-D8	2037-26-5	2	%		**93.6**	**85.2**	**81.0**	-----	-----
4-Bromofluorobenzene	460-00-4	2	%		**94.7**	**86.2**	**81.8**	-----	-----
EP231S: PFAS Surrogate									
13C4-PFOS	-----	0.02	%		**102**	**102**	**100**	-----	-----
13C8-PFOA	-----	0.02	%		**101**	**105**	**105**	-----	-----

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137
EP231S: PFAS Surrogate			
13C4-PFOS	---	60	120
13C8-PFOA	---	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry / Biology).

(WATER) EK067G: Total Phosphorus as P by Discrete Analyser
(WATER) EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser
(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser
(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser
(WATER) EG035F: Dissolved Mercury by FIMS
(WATER) EG020F: Dissolved Metals by ICP-MS
(WATER) EP080/071: Total Petroleum Hydrocarbons
(WATER) EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions
(WATER) EP080: BTEXN
(WATER) EP080S: TPH(V)/BTEX Surrogates
(WATER) EP231A: Perfluoroalkyl Sulfonic Acids
(WATER) EP231B: Perfluoroalkyl Carboxylic Acids
(WATER) EP231C: Perfluoroalkyl Sulfonamides
(WATER) EP231D: (n:2) Fluorotelomer Sulfonic Acids
(WATER) EP231P: PFAS Sums
(WATER) EP231S: PFAS Surrogate
(WATER) EA025: Total Suspended Solids dried at 104 ± 2°C

Appendix B. ANZECC & ARMCANZ (2000) water quality guidelines

Table 3.4.1 Trigger values for toxicants at alternative levels of protection. Values in grey shading are the trigger values applying to typical *slightly–moderately disturbed systems*; see table 3.4.2 and Section 3.4.2.4 for guidance on applying these levels to different ecosystem conditions.

Chemical		Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
		Level of protection (% species)				Level of protection (% species)			
		99%	95%	90%	80%	99%	95%	90%	80%
METALS & METALLOIDS									
Aluminium	pH >6.5	27	55	80	150	ID	ID	ID	ID
Aluminium	pH <6.5	ID	ID	ID	ID	ID	ID	ID	ID
Antimony		ID	ID	ID	ID	ID	ID	ID	ID
Arsenic (As III)		1	24	94 [C]	360 [C]	ID	ID	ID	ID
Arsenic (AsV)		0.8	13	42	140 [C]	ID	ID	ID	ID
Beryllium		ID	ID	ID	ID	ID	ID	ID	ID
Bismuth		ID	ID	ID	ID	ID	ID	ID	ID
Boron		90	370 [C]	680 [C]	1300 [C]	ID	ID	ID	ID
Cadmium	H	0.06	0.2	0.4	0.8 [C]	0.7 [B]	5.5 [B, C]	14 [B, C]	36 [B, A]
Chromium (Cr III)	H	ID	ID	ID	ID	7.7	27.4	48.6	90.6
Chromium (CrVI)		0.01	1.0 [C]	6 [A]	40 [A]	0.14	4.4	20 [C]	85 [C]
Cobalt		ID	ID	ID	ID	0.005	1	14	150 [C]
Copper	H	1.0	1.4	1.8 [C]	2.5 [C]	0.3	1.3	3 [C]	8 [A]
Gallium		ID	ID	ID	ID	ID	ID	ID	ID
Iron		ID	ID	ID	ID	ID	ID	ID	ID
Lanthanum		ID	ID	ID	ID	ID	ID	ID	ID
Lead	H	1.0	3.4	5.6	9.4 [C]	2.2	4.4	6.6 [C]	12 [C]
Manganese		1200	1900 [C]	2500 [C]	3600 [C]	ID	ID	ID	ID
Mercury (inorganic)	B	0.06	0.6	1.9 [C]	5.4 [A]	0.1	0.4 [C]	0.7 [C]	1.4 [C]
Mercury (methyl)		ID	ID	ID	ID	ID	ID	ID	ID
Molybdenum		ID	ID	ID	ID	ID	ID	ID	ID
Nickel	H	8	11	13	17 [C]	7	70 [C]	200 [A]	560 [A]
Selenium (Total)	B	5	11	18	34	ID	ID	ID	ID
Selenium (SeIV)	B	ID	ID	ID	ID	ID	ID	ID	ID
Silver		0.02	0.05	0.1	0.2 [C]	0.8	1.4	1.8	2.6 [C]
Thallium		ID	ID	ID	ID	ID	ID	ID	ID
Tin (inorganic, SnIV)		ID	ID	ID	ID	ID	ID	ID	ID
Tributyltin (as µg/L Sn)		ID	ID	ID	ID	0.0004	0.006 [C]	0.02 [C]	0.05 [C]
Uranium		ID	ID	ID	ID	ID	ID	ID	ID
Vanadium		ID	ID	ID	ID	50	100	160	280
Zinc	H	2.4	8.0 [C]	15 [C]	31 [C]	7	15 [C]	23 [C]	43 [C]
NON-METALLIC INORGANICS									
Ammonia	D	320	900 [C]	1430 [C]	2300 [A]	500	910	1200	1700
Chlorine	E	0.4	3	6 [A]	13 [A]	ID	ID	ID	ID
Cyanide	F	4	7	11	18	2	4	7	14
Nitrate	J	17	700	3400 [C]	17000 [A]	ID	ID	ID	ID
Hydrogen sulfide	G	0.5	1.0	1.5	2.6	ID	ID	ID	ID
ORGANIC ALCOHOLS									
Ethanol		400	1400	2400 [C]	4000 [C]	ID	ID	ID	ID
Ethylene glycol		ID	ID	ID	ID	ID	ID	ID	ID
Isopropyl alcohol		ID	ID	ID	ID	ID	ID	ID	ID
CHLORINATED ALKANES									
Chloromethanes									
Dichloromethane		ID	ID	ID	ID	ID	ID	ID	ID
Chloroform		ID	ID	ID	ID	ID	ID	ID	ID
Carbon tetrachloride		ID	ID	ID	ID	ID	ID	ID	ID
Chloroethanes									
1,2-dichloroethane		ID	ID	ID	ID	ID	ID	ID	ID
1,1,1-trichloroethane		ID	ID	ID	ID	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
1,1,2-trichloroethane	5400	6500	7300	8400	140	1900	5800 [C]	18000 [C]
1,1,2,2-tetrachloroethane	ID	ID	ID	ID	ID	ID	ID	ID
Pentachloroethane	ID	ID	ID	ID	ID	ID	ID	ID
Hexachloroethane B	290	360	420	500	ID	ID	ID	ID
Chloropropanes								
1,1-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
1,2-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
CHLORINATED ALKENES								
Chloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1-dichloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1,2-trichloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1,2,2-tetrachloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
3-chloropropene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloropropene	ID	ID	ID	ID	ID	ID	ID	ID
ANILINES								
Aniline	8	250 [A]	1100 [A]	4800 [A]	ID	ID	ID	ID
2,4-dichloroaniline	0.6	7	20	60 [C]	ID	ID	ID	ID
2,5-dichloroaniline	ID	ID	ID	ID	ID	ID	ID	ID
3,4-dichloroaniline	1.3	3	6 [C]	13 [C]	85	150	190	260
3,5-dichloroaniline	ID	ID	ID	ID	ID	ID	ID	ID
Benzidine	ID	ID	ID	ID	ID	ID	ID	ID
Dichlorobenzidine	ID	ID	ID	ID	ID	ID	ID	ID
AROMATIC HYDROCARBONS								
Benzene	600	950	1300	2000	500 [C]	700 [C]	900 [C]	1300 [C]
Toluene	ID	ID	ID	ID	ID	ID	ID	ID
Ethylbenzene	ID	ID	ID	ID	ID	ID	ID	ID
o-xylene	200	350	470	640	ID	ID	ID	ID
m-xylene	ID	ID	ID	ID	ID	ID	ID	ID
p-xylene	140	200	250	340	ID	ID	ID	ID
m+*p*-xylene	ID	ID	ID	ID	ID	ID	ID	ID
Cumene	ID	ID	ID	ID	ID	ID	ID	ID
Polycyclic Aromatic Hydrocarbons								
Naphthalene	2.5	16	37	85	50 [C]	70 [C]	90 [C]	120 [C]
Anthracene B	ID	ID	ID	ID	ID	ID	ID	ID
Phenanthrene B	ID	ID	ID	ID	ID	ID	ID	ID
Fluoranthene B	ID	ID	ID	ID	ID	ID	ID	ID
Benzo(a)pyrene B	ID	ID	ID	ID	ID	ID	ID	ID
Nitrobenzenes								
Nitrobenzene	230	550	820	1300	ID	ID	ID	ID
1,2-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,4-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3,5-trinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-methoxy-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-methoxy-4-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-3-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-4-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-2,4-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,2-dichloro-3-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloro-5-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,4-dichloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
2,4-dichloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Hexazinone	ID	ID	ID	ID	ID	ID	ID	ID
Simazine	0.2	3.2	11	35	ID	ID	ID	ID
Urea herbicides								
Diuron	ID	ID	ID	ID	ID	ID	ID	ID
Tebuthiuron	0.02	2.2	20	160 [C]	ID	ID	ID	ID
Miscellaneous herbicides								
Acrolein	ID	ID	ID	ID	ID	ID	ID	ID
Bromacil	ID	ID	ID	ID	ID	ID	ID	ID
Glyphosate	370	1200	2000	3600 [A]	ID	ID	ID	ID
Imazethapyr	ID	ID	ID	ID	ID	ID	ID	ID
Ioxynil	ID	ID	ID	ID	ID	ID	ID	ID
Metolachlor	ID	ID	ID	ID	ID	ID	ID	ID
Sethoxydim	ID	ID	ID	ID	ID	ID	ID	ID
Trifluralin B	2.6	4.4	6	9 [A]	ID	ID	ID	ID
GENERIC GROUPS OF CHEMICALS								
Surfactants								
Linear alkylbenzene sulfonates (LAS)	65	280	520 [C]	1000 [C]	ID	ID	ID	ID
Alcohol ethoxyolated sulfate (AES)	340	650	850 [C]	1100 [C]	ID	ID	ID	ID
Alcohol ethoxylated surfactants (AE)	50	140	220	360 [C]	ID	ID	ID	ID
Oils & Petroleum Hydrocarbons	ID	ID	ID	ID	ID	ID	ID	ID
Oil Spill Dispersants								
BP 1100X	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 7664	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 8667		ID	ID	ID	ID	ID	ID	ID
Corexit 9527	ID	ID	ID	ID	230	1100	2200	4400 [A]
Corexit 9550	ID	ID	ID	ID	ID	ID	ID	ID

Notes: Where the final water quality guideline to be applied to a site is below current analytical practical quantitation limits, see Section 3.4.3.3 for guidance.

Most trigger values listed here for metals and metalloids are *High reliability* figures, derived from field or chronic NOEC data (see 3.4.2.3 for reference to Volume 2). The exceptions are *Moderate reliability* for freshwater aluminium (pH >6.5), manganese and marine chromium (III).

Most trigger values listed here for non-metallic inorganics and organic chemicals are *Moderate reliability* figures, derived from acute LC_{50} data (see 3.4.2.3 for reference to Volume 2). The exceptions are *High reliability* for freshwater ammonia, 3,4-DCA, endosulfan, chlorpyrifos, esfenvalerate, tebuthiuron, three surfactants and marine for 1,1,2-TCE and chlorpyrifos.

* = *High reliability* figure for esfenvalerate derived from mesocosm NOEC data (no alternative protection levels available).

A = Figure may not protect key test species from acute toxicity (and chronic) — check Section 8.3.7 for spread of data and its significance. 'A' indicates that trigger value > acute toxicity figure; note that trigger value should be <1/3 of acute figure (Section 8.3.4.4).

B = Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered (see Sections 8.3.3.4 and 8.3.5.7).

C = Figure may not protect key test species from chronic toxicity (this refers to experimental chronic figures or geometric mean for species) — check Section 8.3.7 for spread of data and its significance. Where grey shading and 'C' coincide, refer to text in Section 8.3.7.

D = Ammonia as TOTAL ammonia as [NH_3-N] at pH 8. For changes in trigger value with pH refer to Section 8.3.7.2.

E = Chlorine as total chlorine, as [Cl]; see Section 8.3.7.2.

F = Cyanide as un-ionised HCN, measured as [CN]; see Section 8.3.7.2.

G = Sulfide as un-ionised H_2S, measured as [S]; see Section 8.3.7.2.

H = Chemicals for which algorithms have been provided in table 3.4.3 to account for the effects of hardness. The values have been calculated using a hardness of 30 mg/L $CaCO_3$. These should be adjusted to the site-specific hardness (see Section 3.4.3).

J = Figures protect against toxicity and do not relate to eutrophication issues. Refer to Section 3.3 if eutrophication is the issue of concern.

ID = Insufficient data to derive a reliable trigger value. Users advised to check if a low reliability value or an ECL is given in Section 8.3.7.

T = Tainting or flavour impairment of fish flesh may possibly occur at concentrations below the trigger value. See Sections 4.4.5.3/3 and 8.3.7.

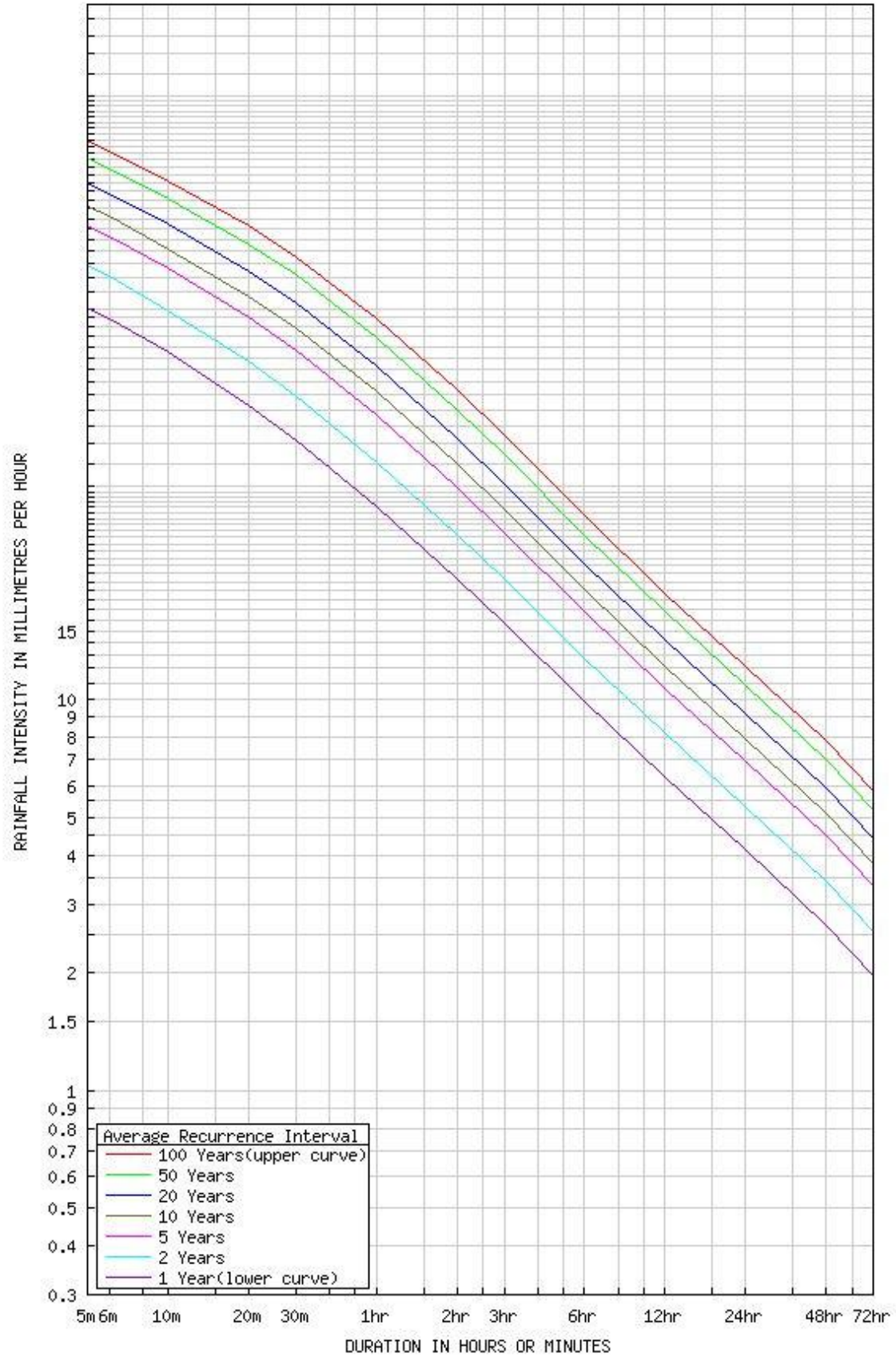
Table 5. Ecological water quality guideline values developed by water regulators

Exposure scenario	PFOS	PFOA	Exposure scenario	Comments and source
Freshwater	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	Australian and New Zealand Guidelines for Fresh and Marine Water Quality - technical draft default guideline values for PFOS and PFOA. Note 1: The 99% species protection level for PFOS is close to the level of detection. Agencies may wish to apply a 'detect' threshold in such circumstances rather than a quantified measurement. Note 2: The draft guidelines do not account for effects which result from the biomagnification of toxicants in air-breathing animals or in animals which prey on aquatic organisms. Note 3: The WQGs advise[41] that the 99% level of protection be used for slightly to moderately disturbed systems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. Regulators may specify or environmental legislation may prescribe the level of species protection required, rather than allowing for case-by-case assessments.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	
Interim marine	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	As above. Freshwater values are to be used on an interim basis until final marine guideline values can be set using the nationally-agreed process under the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Note 1: The WQG advise that in the case of estuaries, the most stringent of freshwater and marine criteria apply, taking account of any available salinity correction. Note 2: Marine guideline values developed by CRC CARE are under consideration through the nationally-agreed water quality guideline development process.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	

https://www.waterquality.gov.au/sites/default/files/documents/ANZECC-1992-guidelines.pdf

Type of indicator	Indicator	Units	Fresh waters	Marine waters
	Dissolved oxygen[2]	mg/L	> 6 (> 80–90% saturation)	> 6 (> 80–90% saturation)
	Nutrients/nuisance growths	–	(Section 2.3.3)	(Section 2.3.3)
	pH	–	6.5–9.0	< 0.2 pH unit change
	Salinity	mg/L	< 1000 (about 1,500 µS/cm)	–
	Suspended particulate matter/turbidity	–	< 10% change seasonal mean concentration (see also colour & clarity)	< 10% change seasonal mean concentration (see also colour & clarity)
	Temperature[3]	–	< 2°C increase	< 2°C increase
Toxicants				
Inorganic toxicants	Aluminium	µg/L	< 5.0 (if pH < = 6.5)	NR
	Aluminium	µg/L	< 100.0 (if pH > 6.5)	–
	Ammonia	µg/L	20.0–30.0 (Table 2.3)	NR
	Antimony	µg/L	30.0	500.0
	Arsenic	µg/L	50.0	50.0
	Beryllium	µg/L	4.0[4]	NR
	Cadmium	µg/L	0.2–2.0[5]	2.0
	Chromium	µg/L	10.0	50.0
	Copper	µg/L	2.0–5.0[5]	5.0
	Cyanide	µg/L	5.0	5.0
	Iron	µg/L	1,000.0[6]	NR
	Lead	µg/L	1.0–5.0[5]	5.0
	Mercury	µg/L	0.1	0.1
	Nickel	µg/L	15.0–150.0[5]	15.0
	Selenium	µg/L	5.0	70.0
	Silver	µg/L	0.1	1.0
	Sulfide	µg/L	2.0	2.0
	Thallium	µg/L	4.0	20.0
	Tin (tributyltin)	µg/L	0.008	0.002
	Zinc	µg/L	5.0–50.0[6]	50.0
Organic toxicants	Acrylonitrile	µg/L	NR	NR
	Benzidine	µg/L	NR	NR
	Dichlorobenzidine	µg/L	NR	NR
	Diphenylhydrazine	µg/L	NR	NR
Halogenated aliphatic compounds	Hexachlorobutadiene	µg/L	0.1	0.3
	Halogenated ethers	µg/L	NR	NR
	Isophorone	µg/L	NR	NR
Monocyclic aromatic compounds	Benzene	µg/L	300.0	300.0
	Chlorinated benzenes	µg/L	(Table 2.8)	NR

Appendix C. Intensity Frequency Duration – Average Recurrence Interval Indicator
Intensity-Frequency-Duration (bom.gov.au)



Apical
Bushfire and Planning

Moorebank Logistics Park West Precinct Basin (OSD-5) Location

Stormwater Network Water Quality Monitoring Data & Reporting November 2025

Site image: Outlet George River Basin 6 MPW (Apical image November 2025)

Prepared for: MID Plumbing P/L SIOMP Moorebank Precinct West (Spring 2025)

Prepared by: Daniel Anderson *(BEnvSc, MEnvSc)*

E-mail: daniel@apical-bushfire.com.au
Phone: 0415617771
PO Box 149 Kiama NSW 2533
ABN: 656 420 10 400

Consulted Documents / database.

Australia and New Zealand Guidelines for fresh and Marine Water Quality (2000)
NATIONAL WATER QUALITY MANAGEMENT STRATEGY - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) - Volume 2 - Aquatic ecosystems

Bureau of Meteorology – Australian Government Australia's official weather forecasts & weather radar - Bureau of Meteorology (bom.gov.au)

Moorebank Intermodal Precinct West – Stage 3 (SSD 10431) | Assessment Report March 2021
https://moorebankintermodalprecinct.com.au/wp-content/uploads/2023/04/MPW-S3-DPIE-assessment-report-to-IPC.pdf

WQM Report Western Precinct _Basin 5_Autumn 2024 – Apical Bushfire and Planning - April 2024

WQM Report Western Precinct _Basin 8_Spring 2024 – Apical Bushfire and Planning - October 2024

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 7709 Applicant: Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings Limited Consent Authority: The Independent Planning Commission Site: Moorebank Avenue, Moorebank Lot 1 DP 1197707 Lot 100 DP 1049508 Lot 101 DP 1049508 Lot 2 DP 1197707 Part Lot 3 DP 1197707 Part Anzac Road and Moorebank Avenue public road reserves Development: Moorebank Precinct West Stage 2 (MPW Stage 2)

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 10431 Applicant: Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings Limited Consent Authority: The Independent Planning Commission Site: Moorebank Avenue, Moorebank Lot 1 DP 1197707 Lot 100 DP 1049508 Lot 101 DP 1049508 Moorebank Precinct West Stage 3 (MPW Stage 3)

Australian Laboratory Services (ALS) Work Order EW2402561 Certificate of Analysis Water Sample Data 9th April 2025.

Liverpool DCP
Liverpool's Development Control Plans | Liverpool City Council (nsw.gov.au)

DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.
https://environment.gov.au/system/files/pages/dfb876c5-581e-48b7-868c-242fe69dad68/files/draft-environmental-mgt-guidance-pfos-pfoa.pdf

Development Consent SSD 7709 - Section 4.38 of the Environmental Planning and Assessment Act 1979
https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2019/05/moorebank-intermodal-precinct-west-stage-2/referral-from-department-of-planning-and-environment/revised-recommended-conditions/mpw-stage-2-recommended-conditions-inclusive-of-edits-191105.pdf

Glossary

The following definitions apply to terms used in this report. Many of these definitions are consistent with relevant national literature and cited where appropriate.

Current status trigger value
Concentrations of water quality indicators that reflect existing ecosystem condition, and therefore provide a target for ecosystem maintenance and a benchmark against which future water quality trends may be monitored.

Environmental value
Particular values or uses of the environment important for a healthy ecosystem or for public benefit, welfare, safety or health and requiring protection from the effects of pollution or degradation (Environment Australia 2002).

Indicator
A parameter (biological, physical or chemical) used to provide a measure of the quality of water or the condition of an ecosystem (Environment Australia 2002).

Low-risk trigger value
Concentrations (or loads) of key performance indicators [of water quality] at which if not exceeded, there is a low risk that adverse biological effects will occur (ANZECC 2000a).

Median
The middle reading, or 50th percentile, of all readings taken. i.e. of the readings 10, 13, 9, 16 and 11 (re-ordering these to read 9, 10, 11, 13 and 16), the median is 11. The mean (or average), is the sum of all values divided by the total number of readings (which in this case equals 11.8).

Reference condition
Refers to a site which is unmodified or minimally modified from 'natural' condition. Most commonly, reference sites are subject to limited disturbance from human activity. The reference condition then serves as a standard or target against which environmental change in other similar sites can be assessed.

Trigger value
A concentration that, if exceeded, would indicate a potential environmental problem, and so 'trigger' a management response, such as further investigation and/or remedial actions (ANZECC 2000a).

Water quality guideline
A numerical concentration level (e.g. of a contaminant) or narrative statement (e.g. visual appearance of a water body) recommended to support and maintain a designated water use (ANZECC 2000a)

1.1 Background

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 3 (the Project) of Moorebank Precinct West (MPW), which comprises the third stage of development within the Moorebank Precinct West under Development Approval SSD-10431.

The proposal is SSD under clause 19 of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011, as it is development for the purpose of rail and related transport facilities.

The MPW site is located on the western side of Moorebank Avenue and forms the western section of the Moorebank Intermodal Precinct (Map Image 2).

The MPW site is approximately 2.5 kilometres (km) from the Liverpool city centre, 27 km south-west of the Sydney Central Business District (CBD) and 26 km west of Port Botany.

The MPW site is irregular in shape, approximately 3 km from north to south and 960 m from east to west at its widest point and covers an area of approximately 220 ha. It is situated between the Georges River to the west (with the SSFL running north-south to the west of the river); and Moorebank Avenue to the east.

Works on the MPW site to date have commenced under two current and active development consents:

• MPW Stage 1 early works, which provides demolition, rehabilitation, remediation of contaminated land, and the establishment of construction facilities and access including site security (as part of the SSD 5066 consent)

• MPW Stage 2, which provides for the construction and 24/7 operation of an intermodal facility and associated warehousing (SSD 7709).

This WQM period refers to Stage 2 development and partial operation of the site with active tenancy across buildings located to the MPW zone.

This water quality monitoring program is guided by the Stormwater Infrastructure Operation and Maintenance Plan (SIOMP) and is provided to site management on behalf of MID Plumbing.

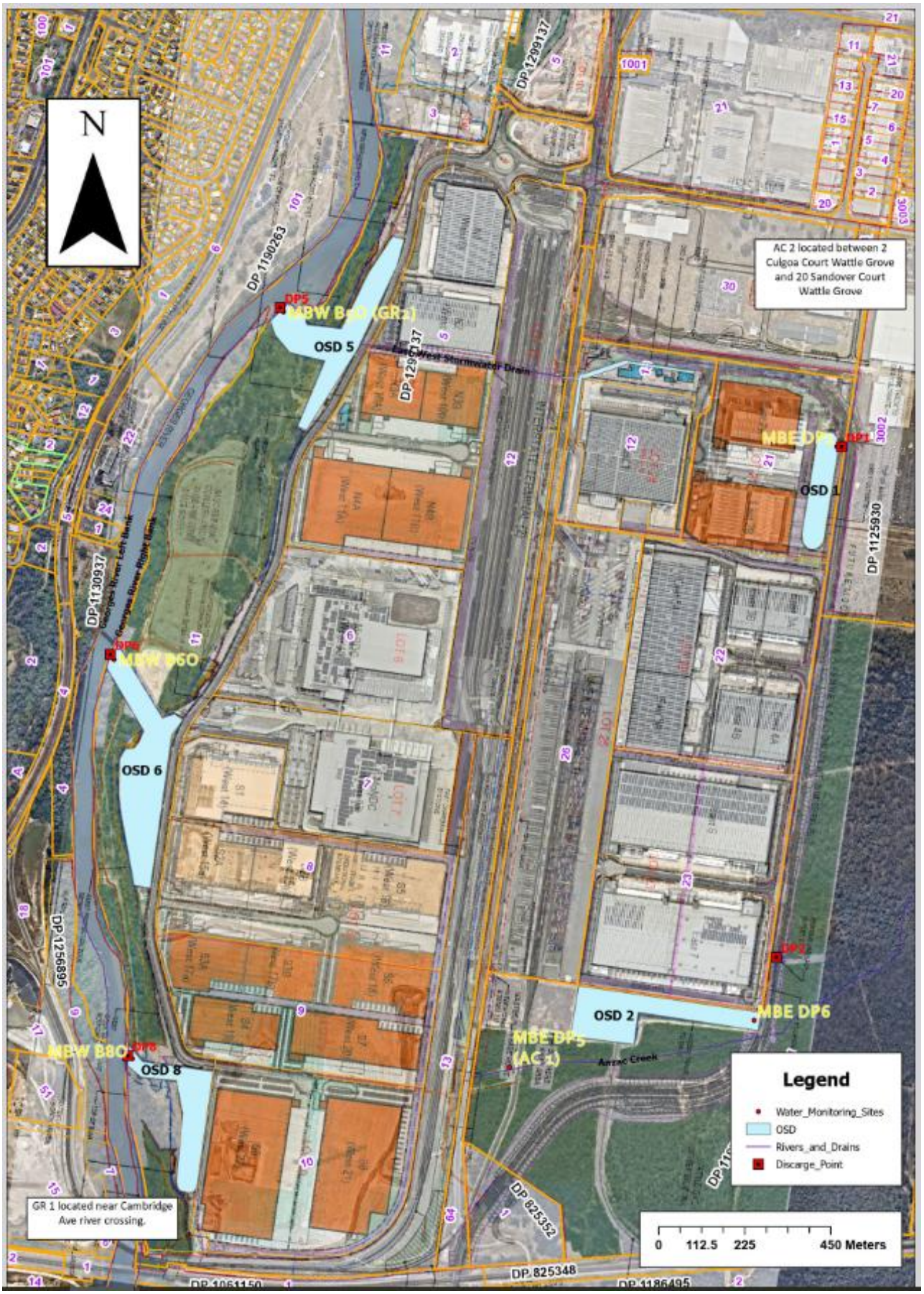
Three onsite bio-retention basins are present within Moorebank Precinct West. This report is in reference to baseline water quality condition reporting for Basin 5 (MPW – north).

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 7709 Moorebank Precinct West Stage 2 (MPW Stage 2)

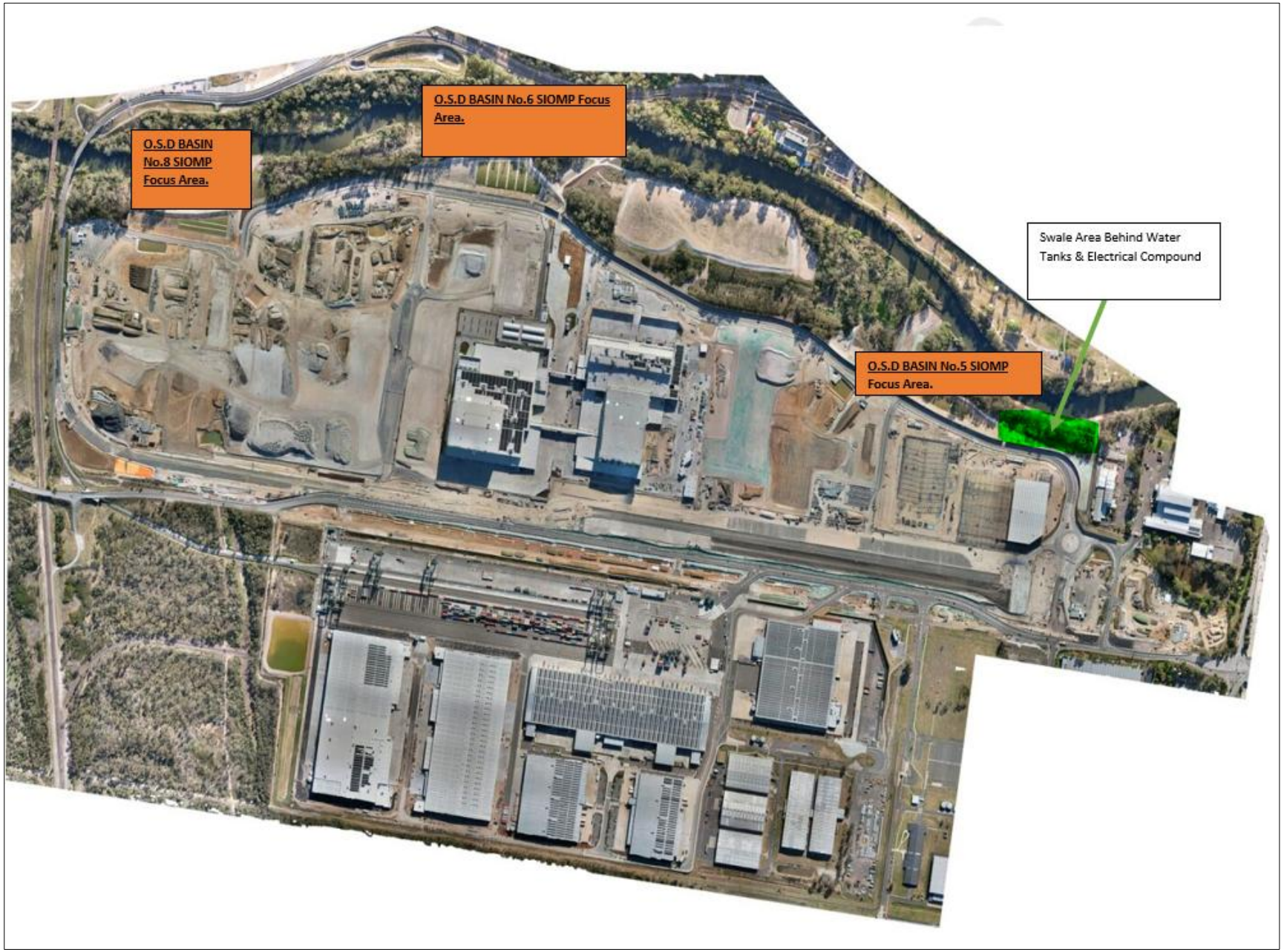
CoC	Requirement
Stormwater Quality Monitoring	
B38.	Stormwater Quality Monitoring Program - Prior to commencement of operation Part of the Operational Environmental Management Plan

The Stormwater Infrastructure Operation and Maintenance Plan (SIOMP) Moorebank Logistics Park – West Precinct was developed to address the requirements of MPE stage 3 CoCs (SSD 7709). The management plan (SIOMP) identifies the operational drainage and environmental management measures within the stormwater management system that will be applied to activities undertaken across the MLP west Precinct to manage improved water quality objectives and overall functionality of the stormwater detention and drainage network associated with stormwater infrastructure upon the site under the SIOMP.

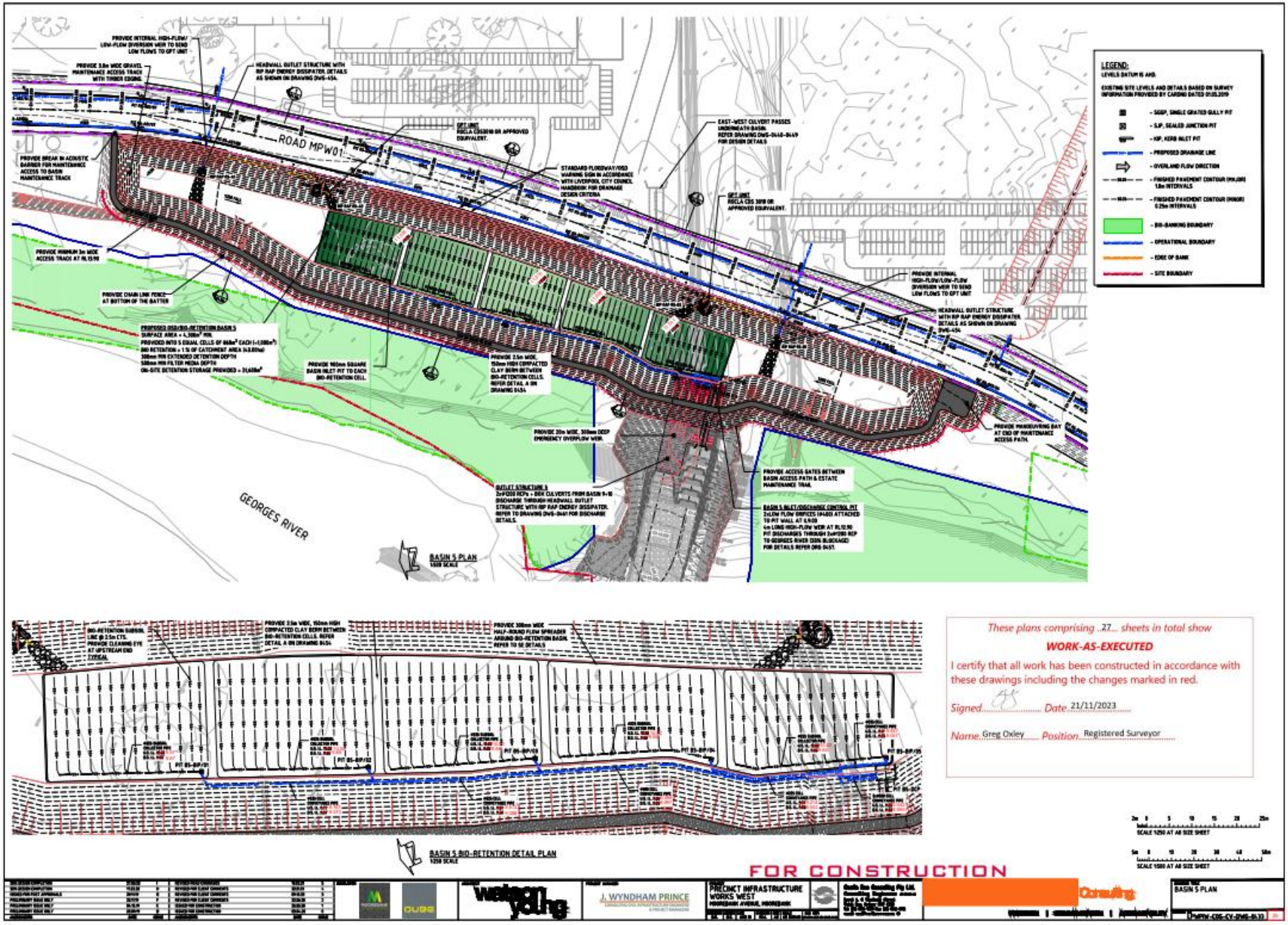
Map image 1. Overview subject site (MPW) provided by Arcadis



Map Image 2. Moorebank Precinct West Detention Basins (provided by MID Plumbing)

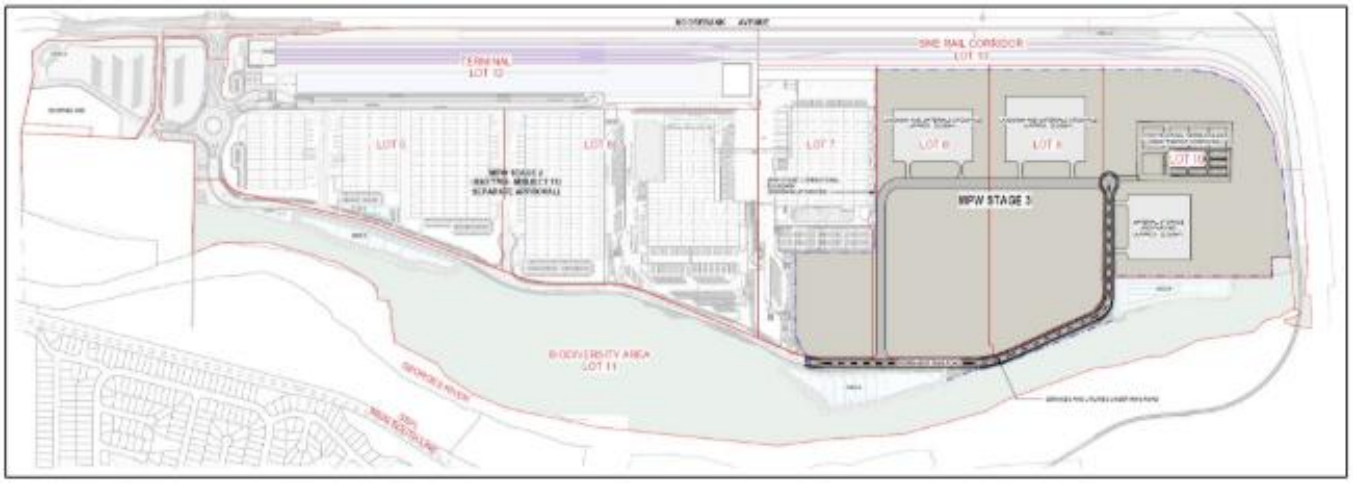


Map image 3. Detention Basin 5 MPW (north)



1.2 Reference information

Map image 4. Moorebank Intermodal Precinct West – Stage 3 State Significant Development Assessment (SSD-10431) March 2021



20. Stormwater Management System or Works	That untreated stormwater is not disposed of into the Georges River or its tributaries. The likely impact of stormwater disposal on the quality of any receiving waters. That the levels of nutrients and sediments entering the waterway are not increased by the proposed development. Whether any proposals to manage stormwater are in accordance with the local council's stormwater management plans and the Managing Urban Stormwater series of documents and meet the local council's stormwater management objectives. Whether the principles outlined in the *Managing Urban Stormwater Soils and Construction Handbook* (1998) prepared by and available from Landcom and the Department of Housing are followed during each stage of a development (including subdivision).	Detailed stormwater assessments were undertaken as part of MPW Stage 2, and remain applicable to the Stage 3 proposal. The Department has recommended conditions that would enforce these requirements, by ensuring that appropriate measures are implemented to manage stormwater impacts during construction. In regard to management of stormwater during operation of the MPW site, the MPW Stage 2 proposal incorporates a robust set of conditions to manage the release of stormwater via six onsite detention basins (OSD), a major east-west covered culvert and associated drainage infrastructure.

2. Monitoring Program Methodology

2.1 Monitoring Sites

To support stormwater and drainage management of the facility the MLP West precinct has established a vast stormwater infrastructure system consisting of several Water Sensitive Urban Design (WSUD) functions including raingardens detention basins and bio-swales. These networks are designed to minimise the velocity and peak discharge of stormwater draining from the site and act as onsite detention basins to harvest and sequester potential pollutants generated at the site through designed biological processes.

The stormwater infrastructure system discharges water into the natural drainage system via three outlets:

- Basin 5 detains water from the northern section of MPW before discharging into Georges River
- Basin 6 detains water from the mid-section of MPW before discharging into Georges River
- Basin 8 detains water from the southern section of MPW before discharging into Georges River

Monitoring of the discharge points has been established via our ongoing program with MID Plumbing under the SIOMP program (MPE) to collect qualitative data and analyse the performance of the WSUD provisions and to establish any potential trends in water quality readings from the stormwater network discharge points prior to release of water into the natural hydrological systems of Anzac Creek and the Georges River.

This report constitutes the Spring 2025 water quality data alongside baseline data for Basin 5 (OSD-5) Moorebank Precinct West (MPW).

Table 1. Type of outlet MPW

Discharge Point (see figure 2)	Associated Outlet (see figure 1)	Type of outlet/detention basin
Basin 5	Inlet	Bio retention basin (holding)
	Outlet	Outlet point – rock ramp
	Georges River	River – natural drainage conveyance
Basin 6	Inlet	Bio retention basin (holding)
	Outlet	Outlet point – rock ramp
Basin 8	Inlet	Bio retention basin (holding)
	Outlet	Outlet point – rock ramp

2.2 Water Quality Assessment

Surface water quality data collected at the discharge points is assessed with reference to ANZECC Guidelines (2000) and correlated with baseline & Spring 2025 Water Quality monitoring results provided by previous condition assessment reports.

By comparing water test data under the program across the testing timeline we can identify and report upon trends, identify exceedances and exclude potential anomalies for datasets.

Water from OSD-5 is released to the Georges River a natural riverine system located to the south west of the Sydney Basin.

Table 2. ANZECC Low Risk Trigger Values

Ecosystem type	Turbidity NTU	EC µS/cm	pH*	DO	TN mg/L	NO_x - N mg/L	NH_4^+ - N mg/L	TP mg/L	DRP - P mg/L
Upland river	2-25	30-350	6.5-7.5	90-110	0.480	0.190	0.013	0.013	0.005
Lowland river	6-50	125-2200	6.5-8.0	85-110	0.500	0.190	0.020	0.050	0.020

Values for Low Land River Systems as insert above are used as the reference guide to water quality parameter values and overall health and safety statements regarding the quality of discharged water from the SIOMP drainage network.

Annual spring and autumn water quality data presented from Anzac Creek and Georges River testing programs by other scientific consultants may also be cross referenced to the data prepared by Apical under the SIOMP program to establish potential trends in results and identify increases in accumulated pollutants from the site under operational condition, which may appear present within adjacent natural waterways.

Site data was collected in the form of water samples and in field data recordings at the prescribed monitoring points, water samples and water probe readings are undertaken following Australia and New Zealand guidelines for fresh and marine water quality – 2000 (ANZECC Guidelines), In situ water quality parameters relevant to stream health and aquatic assessment profiling were collected in field with a multiparameter hand-held water quality monitoring probe (Aquatroll 600).

Water data is collected, analysed and collated under the same methodologies and process under each testing period, the ensure consistency in the process.

Measures tested and samples taken:

- pH
- Dissolved Oxygen
- Electrical Conductivity
- Water Temperature and
- Turbidity

Water samples are collected at inlet and discharge points (Basin 5, Basin 6 & Basin 8) then sent to Australian Laboratory Services (ALS) for quality testing analysis Surface water (alsglobal.com).

Water analytical suites / testing parameters are provided to obtain overall water condition results and chemical sampling of collected water is undertaken for a range of nutrients, metals, and hydrocarbons relevant to stream health and aquatic assessment protocol, key nutrients, metals, and pollutants included in the assessment to reflect an overall suite of water quality condition guides which are listed below:

- Total phosphorous
- Total Nitrogen
- Kjeldahl Nitrogen
- Dissolved Metals
- PFAS
- Total Suspended Solids
- Total Hydrocarbons

The raw data results from the lab analysis provided to us by ALS Laboratory Services are presented within this report (see Appendix A).

Key water quality data attributes are recorded, tables and compared against; previous condition baseline

data, Liverpool Development Control Plan (DCP) water quality targets, Conditions of Consent B40 and ANZECC Guideline (2000) trigger limits under the condition category 90% protection criteria for freshwater natural systems.

The water quality guidelines are applied to ensure adjacent natural waterways George River and Anzac creek are not adversely affected by poor water quality discharge from the Moorebank logistics park site and operations.

Trends observed in our datasets are analysed on a temporal scale with any trigger values for specific water quality measures highlighted and presented within the results chapter of each seasonal report. This report provides baseline & Spring 2024 data for Basin 5 (MPW) from which trend analysis will compound over future reporting periods.

2.3 Data Analysis

The water quality measurements collected are used to assess water quality at each site in terms of health of aquatic ecosystems by comparison with guideline values recommended by the ANZECC and ARMCANZ (2000) guidelines for the protection of lowland streams (i.e. systems at < 150 m altitude) in south-east Australia. This categorisation for stream health is deemed relevant for the description of Anzac Creek, the recipient natural way due to the location in the geomorphic landscape and correlations of expected biophysical health and habitat profiles for similar stream environments.

2.4 Survey dates and personnel

On the 15th December 2025, ecologists from Apical Bushfire and Planning attended Moorebank Precinct West (MPW) to collect water quality data across the testing sites which are located within selected inlet points and discharge points within the stormwater drainage and management system (SIOMP) located within the Moorebank Logistics Park site West (See map image 2).

Inlet and outlet points within the network are representative of variant sites where stormwater will enter a node of the system (as a point source) and then release from the that node of the system at a discharge point. By recording inlet and discharge data water quality can be tracked along the continuum within the system to determine condition changes and overall trends in measured quality at given sites.

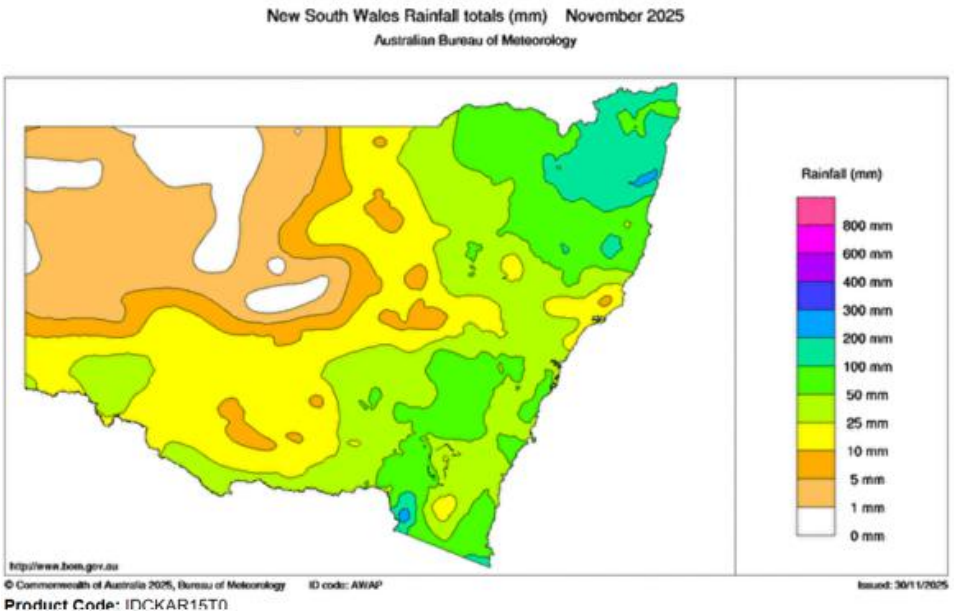
This data was collected on behalf of MID plumbing in accordance with 'The Stormwater Infrastructure Operation and Maintenance Plan Moorebank Logistics Park – West Precinct 2020' and in compliance with Condition of Consent B40 (Liverpool City) for the subject site. The results of such monitoring data collection are presented within this report.

2.5 Rainfall

Between the 1st of November and the 31st of November 2025 Moorebank received 61.6mm of rainfall.

NSW Monthly Rainfall November 2025

61.6 mm for the month in Holsworthy NSW.



3. Results

Data results captured by our water quality sampling are presented herein and are representative of baseline water quality results for Moorebank Precinct West Basin 5. Threshold guideline quantitative values for the water quality parameter themes are compared and correlated to ANZECC/ARMCANZ (2000) guidelines under the categorisation thresholds – Waterway benchmark group: 'The protection of slightly disturbed lowland river ecosystems in southeast Australia'.

As these are the first samples results collected under our scope for the SIOMP-MPW sites, the sampling results presented in this report will be considered for future analysis against subsequent results for use as baseline data for the drainage network SIOMP function.

B-5) OSD-5 outlet

Measures	Results (November 2025)		
Date & Time:	26/11/2025 – 10.14am		
Temperature	24.1		
Dissolved Oxygen %	63		
Dissolved Oxygen mg/L	5.3		
Salinity SPC ms/cm	0.423		
Salinity C-ms/cm	415.3		
TDS mg/L Total Dissolved Solids	275		
pH	7.48		
ORP mV Oxidation reduction potential	147.2		
NTU	8.04		

Collection Site (OSD-5) Basin Discharge to Georges River

B-5) 0utlet (OSD-5)

Measures	Results		
Date & Time:	26/11/2025 – 10.14am		
Temperature	24.1		
Dissolved Oxygen %	63		
Dissolved Oxygen mg/L	5.3		
Salinity SPC ms/cm	0.424		
Salinity C-ms/cm	416.5		
TDS mg/L Total Dissolved Solids	275		
pH	7.5		
ORP mV Oxidation reduction potential	146.8		
NTU	8.57		

Nitrogen

Reporting period	ANZECC Guideline*	April 2025	Nov 2025
Nitrogen µg/L	350 µg/L	400 µg/L	1,110 µg/L

***** ANZECC 2000 Guidelines 350 µg/L for rivers flowing to the coast

Phosphorus

Reporting period	ANZECC Guideline*	April 2025	Nov 2025
Phosphorous µg/L	50 µg/L	0.01 µg/L	210 µg/L

***** ANZECC 2000 Guidelines 50 µg/L for rivers flowing to the coast

Testing period	Trigger Value
Nitrogen µg/L	350 µg/L for rivers
Phosphorous µg/L	25 µg/L - 50 µg/L

Location Basin 5 Outflow

Nitrogen 1,110 µg/L (Guideline trigger 350 µg/L)

Phosphorus 210 µg/L (Guideline trigger 50 µg/L)

Metals

Testing period	Trigger value ANZECC	April 2025	Nov 2025	
Copper mg/L	0.0014 mg/L	0.005	0.007	
Zinc mg/L	0.008 mg/L	<0.005	<0.005	
Arsenic mg/L	0.03 mg/L	<0.001	<0.001	
Cadmium	0.05 µg/L	<0.0001	<0.0001	
Chromium	5 µg/L	<0.001	<0.001	
Nickle	0.1 µg/L	0.001	<0.001	
Lead	0.005 mg/L	<0.001	<0.001	

Concentrations for dissolved metals are under the ANZECC guidelines. Results for these parameters are considered positive for WQM discharges at the outlet.

Total Suspended Solids

TSS results appear stabilised over the April and November testing period, the levels are under the trigger values
Values are below the ANZECC guidelines and considered acceptable.

Testing period	EPA trigger value	April 2025	Nov 2025	
TSS mg/L	50 mg/L	10mg/L	13 mg/L	

pH

pH values fall within the desirable range at the discharge location

Testing	Trigger Value - ANZECC 2000 Guidelines *Lowland rivers	April 2025	Nov 2025
pH	Min 6.5 Max 8.5	8.32	6.5

PFAS;

OSD -5 - PFAS – Qube Logistics, Moorebank, NSW			
PFAS Surrogate	Measure µg/L	95% species protection (DEE 2016)	Triggered
13C4-PFOS % Sum of PFAS	84.6 % 0.02 (µg/L)	.13 (µg/L)	N
13C8-PFOA % Sum of PFHxS and PFOS	87.2 % 0.02 (µg/L)	220 (µg/L)	N

Notes:

This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include:

- Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation.
- PFOS and PFOA can also be the breakdown endpoint of other precursor products.
- PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife.
- Information on other PFASs, of which there are several hundred known, is more limited.
- Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present.

* DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.

Total Hydrocarbons

OSD-5 - Total hydrocarbons – Qube Logistics, Moorebank, NSW

Total Hydrocarbons assessed alongside baseline data (2018) and Spring monitoring (2025) for Aquatic Monitoring location 11&12 (AQ11 & AQ12 Anzac Creek).

Lab results - Total hydrocarbons:	Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem	Triggered	Baseline monitoring April 2018 (presented by Biosis)	November 2025					
Benzene µg/L	1300 µg/L	N	<1	<1					
Toluene µg/L	-	N	<2	<2					
Ethylbenzene µg/L	-	N	<2	<2					
meta-& para-Xylene µg/L	200 µg/L	N	-	<2					
Ortho-Xylene µg/L	470 µg/L	N	<2	<2					
Total Xylenes µg/L	-	N	-	<2					
Sum of BTEX µg/L	-	N	-	<1					
Naphthalene µg/L	85 µg/L	N	-	<5					

Notes:

- The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia.
- Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Autumn 2019 Survey - Final Report, Bio-Analysis Pty Ltd (2019)

		• Moorebank Precinct East - Stage 2 B106 – Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (SSD 7628) Biosis (2018) • A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX

B-5) 0utlet (OSD-5)

Measures	Results	Results	Results
Date & Time:	26/11/2025 – 10.14am		
Temperature	24.1		
Dissolved Oxygen %	63		
Dissolved Oxygen mg/L	5.3		
Salinity SPC ms/cm	0.424		
Salinity C-ms/cm	416.5		
TDS mg/L Total Dissolved Solids	275		
pH	7.5		
ORP mV Oxidation reduction potential	146.8		
NTU	8.57		

Collection Site (OSD-5) Basin Discharge to Georges River

B) 5-Inlet (OSD-5)

Measures	Results	Results	Results
Date & Time	26/11/2025 – 10.40am		
Temperature	24.4		
Dissolved Oxygen %	108		
Dissolved Oxygen mg/L	9.0		
Salinity SPC ms/cm	0.516		
Salinity C-ms/cm	510		
TDS mg/L Total Dissolved Solids	336		
pH	8.68		
ORP mV Oxidation reduction potential	166.3		
NTU	8.96		

Collection Site B) OSD- 5 Basin inlet

Water Quality Monitoring Comparative Table (Temporal)

Table 4. Retention Basin 5 MPW. Testing Site MPW 5 Outflow

Testing Site MPW Outflow	May 2024 baseline	October 2024	April 2025	Nov 2025
pH	6.39	6.21	8.32	7.5
Dissolved Oxygen - %/L	4.11mg/L	10.5	10.19	5.3mg/L
Actual Electronic Conductivity	0.054945	0.008	93.5 ORP mV	146.8 ORP mV
Temperature - ℃	18.12	19.5	21.9	24.1
Turbidity	0.03 NTU	6.62	17.53	8.57
Total phosphorous - mg/L	0.04 mg/L	0.03	<0.01	0.02mg/L
Total nitrogen - mg/L	1.7 mg/L	0.4	0.4	0.3mg/L
Kjeldahl nitrogen mg/L	1.0 mg/L	0.4	0.3	0.3mg/L
Dissolved metals				
Arsenic	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	<0.001	<0.001	<0.001	<0.001
Copper	0.017	<0.001	0.005	0.007
Nickel	0.001	<0.001	0.001	0.001
Lead	<0.001	<0.001	<0.001	<0.001
Zinc	<0.005	0.008	<0.005	<0.005
Mercury	<0.0001	<0.0001	<0.0001	<0.0001
PFAS				
Lab results – SUM of PFAS Micrograms/L	0.13	0.04	0.08	<0.01
SUM of PFHxS & PFOS Microgrms/L	0.04	0.04	0.01	<0.01
Total suspended solids mg/L	6	<5	10	<5
Total hydrocarbons				
Benzene	<1	<1	<1	<1
Toluene	<2	<2	<2	<2
Ethylbenzene	<2	<2	<2	<2
meta-& para-Xylene	<2	<2	<2	<2
Ortho-Xylene	<2	<2	<2	<2
Total Xylenes	<2	<2	<2	<2
Sum of BTEX	<1	<1	<1	<1
Naphthalene	<5	<5	<5	<5

3.2 Interpreting Results

Dissolved Oxygen – Measures:

Dissolved oxygen (DO) is oxygen held (dissolved) in the water and available to aquatic organisms.

The amount of dissolved oxygen in a river or stream can tell us a lot about its water quality.

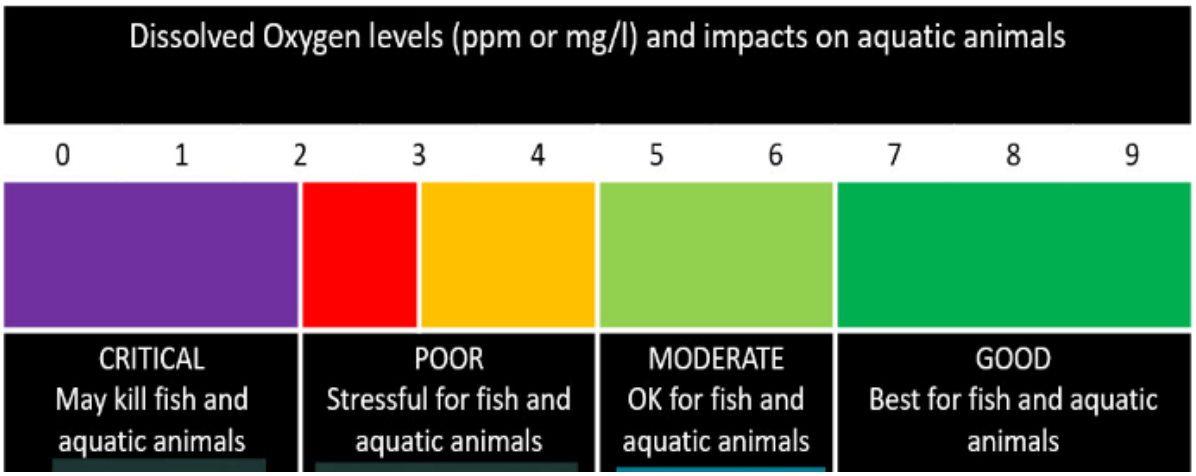
Water will naturally contain a certain amount of dissolved oxygen that is absorbed from the air and produced by plants and algae living in the water.

Temperature has a large effect on the amount of oxygen dissolved in water; cold water can hold higher levels of oxygen than warmer water. Higher water temperatures over summer will cause oxygen levels to drop.

Other factors such as river flow, wind, nutrients and bacterial activity can also affect the amount of dissolved oxygen in waterways.

Dissolved oxygen levels typically range between 5 and 14 mg/L (or ppm).

Example:



Salinity – Measures:

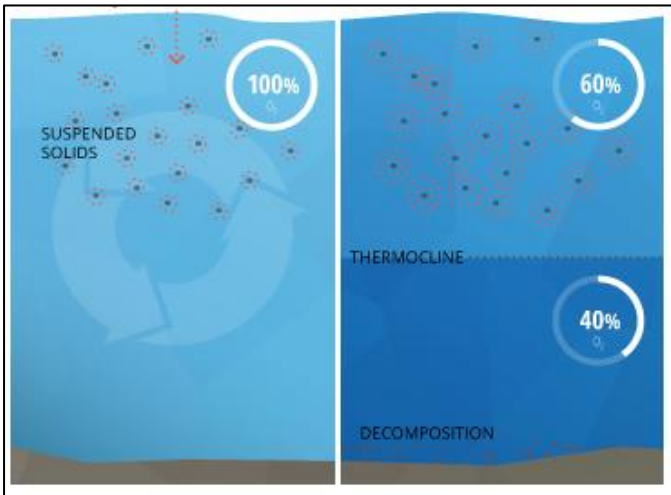
Electrical conductivity is a measure of the saltiness of the water and is measured on a scale from 0 to 50,000 uS/cm. Electrical conductivity is measured in microsiemens per centimeter (uS/cm). Freshwater is usually between 0 and 1,500 uS/cm and typical sea water has a conductivity value of about 50,000 uS/cm.

Examples:

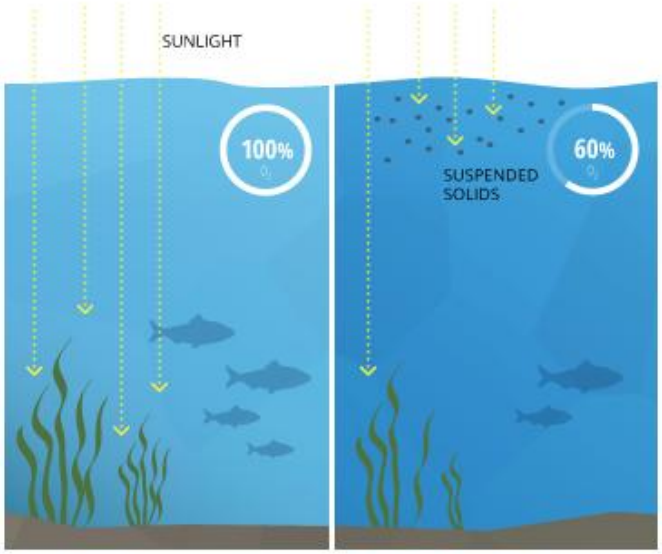
µS/cm	Use
0 - 800	• Good drinking water for humans (provided there is no organic pollution and not too much suspended clay material) • Generally good for irrigation, though above 300µS/cm some care must be, particularly with overhead sprinklers, which may cause leaf, scorch on some salt sensitive plants. • Suitable for all livestock
800 - 2500	• Can be consumed by humans, although most would prefer water in the lower half of this range if available • When used for irrigation, requires special management including suitable soils, good drainage and consideration of salt tolerance of plants • Suitable for all livestock
2500 -10,000	• Not recommended for human consumption, although water up to 3000 µS/cm can be consumed • Not normally suitable for irrigation, although water up to 6000 µS/cm can be used on very salt tolerant crops with very special management techniques. Over 6000 µS/cm, occasional emergency may be possible with care • When used for drinking water by poultry and pigs, the salinity should be limited to about 6000 µS/cm. Most other livestock can use water up to 10000 µS/cm

Total Dissolve Solids (TDS) – Measures

Dissolved solids, smaller than 2 microns, refer to any minerals, salts, metals, in the form of molecules, atoms, cations or anions dissolved in water. Total dissolved solids (TDS) comprise inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates) and some small amounts of organic matter that dissolve in water.
The TDS concentration is the sum of all filterable substances in water that can be determined gravimetrically. However, in most cases, TDS is primarily comprised of ions.
High levels of total suspended solids can affect turbidity, increase water temperatures and decrease dissolved oxygen (DO) levels. This can cause the water to heat up more rapidly because the suspended particles absorb more heat and deplete oxygen, which can adversely affect aquatic life.



Suspended solids can increase the temperature of water as they absorb additional heat from the sun. This can also cause dissolved oxygen levels to drop below the thermocline, creating hypoxic conditions.



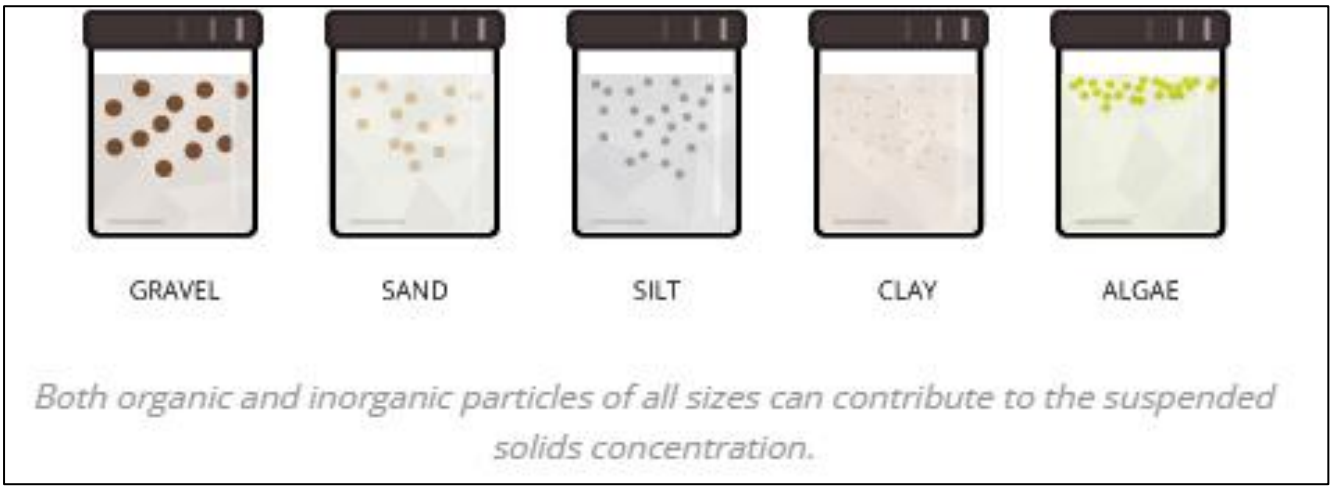
Suspended solids, particularly algae, can block sunlight from reaching submerged plants. This can cause dissolved oxygen levels to drop, as the plants rely on respiration (consuming oxygen) instead of photosynthesis.

Turbidity – Total Suspended Solids (TSS)

Turbidity data are reported in Nephelometric Turbidity Units (NTU). To provide a sense of scale, water with a turbidity

of 1 NTU is crystal clear, water at 5 NTU has a tiny trace of discolouration, and water at 100 NTU is brown and opaque. The standard is less than 10 NTU for rural streams and rivers and less than 30 NTU for urban lakes and ponds.

Total suspended solids (TSS) are particles that are larger than 2 microns found in the water column. Anything smaller than 2 microns (average filter size) is considered a dissolved solid. Most suspended solids are made up of inorganic materials, though bacteria and algae can also contribute to the total solids concentration.



Both organic and inorganic particles of all sizes can contribute to the suspended solids concentration.

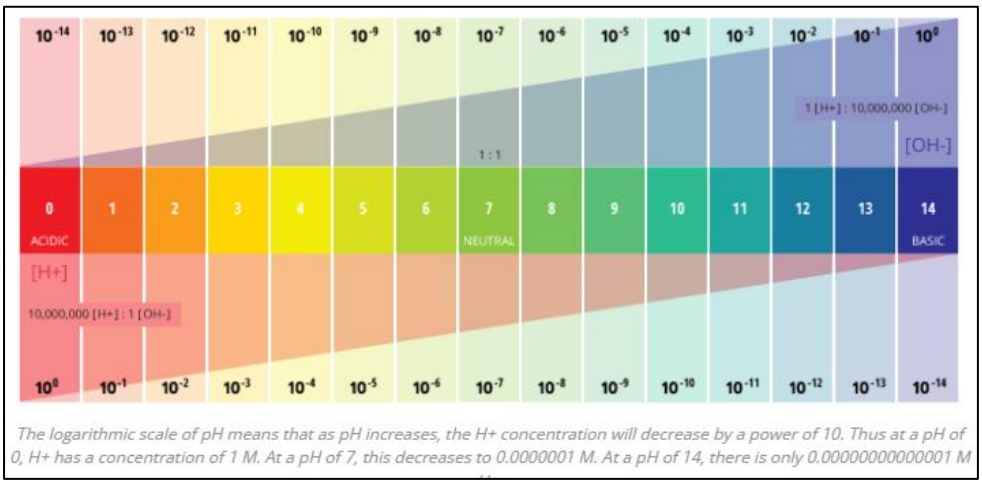
pH – Acidity / Alkalinity – Measures

The pH refers to the degree of acidity or alkalinity of a substance. A pH of 7 is neutral. A value above 7 indicates that the water is more alkaline and a pH below 7 indicates acidic conditions.

A pH of 7 is considered neutral. The logarithmic scale means that each number below 7 is 10 times more acidic than the previous number when counting down. Likewise, when counting up above 7, each number is 10 times more basic than the previous number pH stands for the "power of hydrogen" [3]. The numerical value of pH is determined by the molar concentration of hydrogen ions (H+) [3]. This is done by taking the negative logarithm of the H+ concentration (-log(H+)).

Standard values for pH readings are expected, pH 6.5–9 for rural streams and rivers and pH 6–9 for urban lakes and ponds.

In freshwater systems pH sets up the conditions for how easy it is for nutrients to be available and how easily things like heavy metals (toxicity for aquatic life) can dissolve in the water. Rivers and lakes generally range between 5 (acidic) and 9 (basic) on the pH scale.



The logarithmic scale of pH means that as pH increases, the H+ concentration will decrease by a power of 10. Thus at a pH of 0, H+ has a concentration of 1 M. At a pH of 7, this decreases to 0.0000001 M. At a pH of 14, there is only 0.00000000000001 M

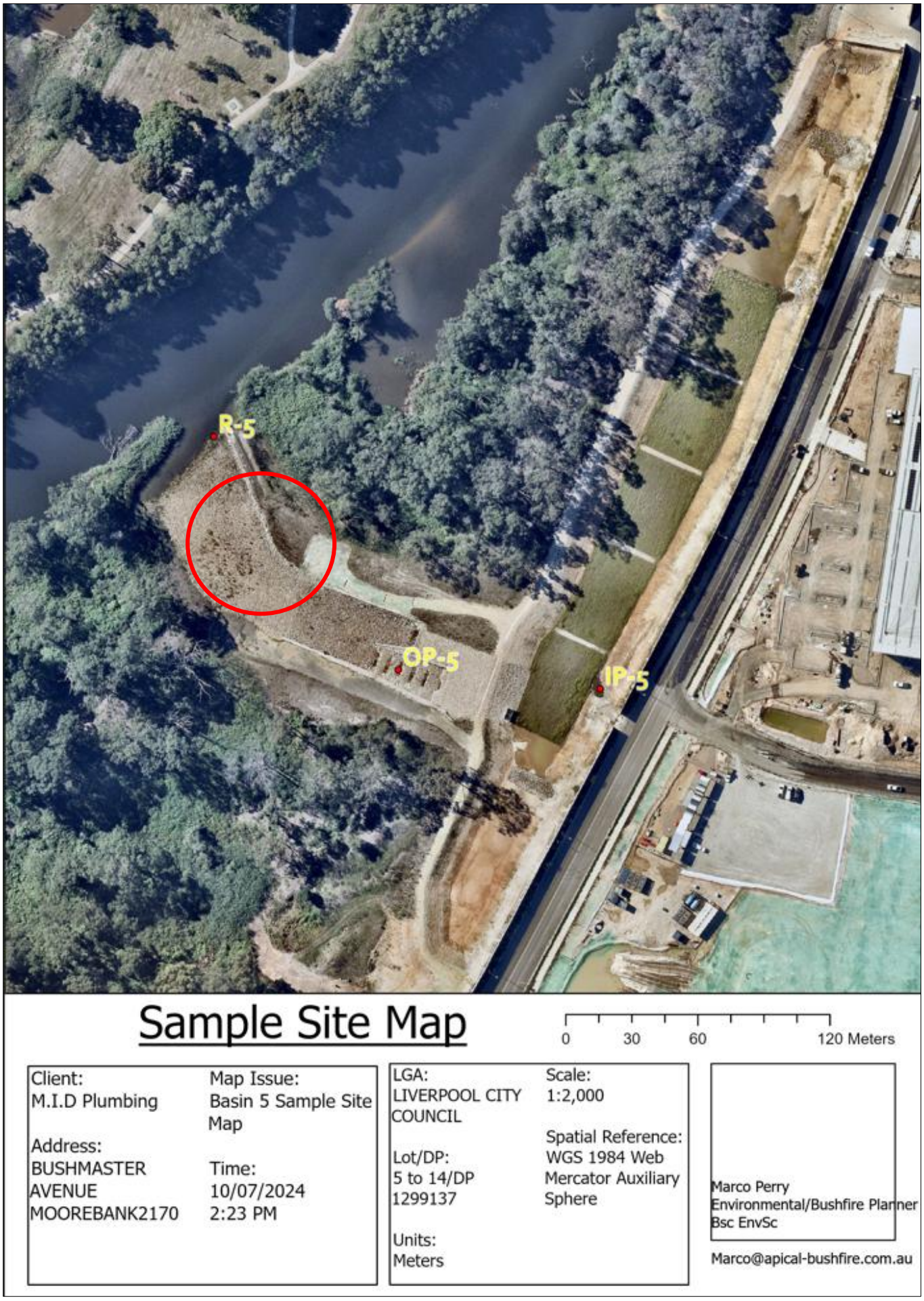
PFAS are per- and polyfluoroalkyl substances, In Australia, the historical use of PFAS in fire-fighting foams has resulted in increased levels being detected at sites like airports, Defence bases, and other sites where fire-fighting training has been conducted, or where fire suppression systems are installed for extinguishing liquid-fuel fires. Increased environmental levels of PFAS have also been found near some industrial areas, effluent outfalls and landfill sites refer

(Australian Government ; What are PFAS? | Australian Government PFAS Taskforce.)

PFAS chemicals can persist in the environment for decades, polluting waterways, soil and air, and build up in the bodies of animals and humans over time.
Two of the best-known types of PFAS are PFOS (perfluorooctane sulfonate), previously used in Scotchgard and firefighting foams, and PFOA (perfluorooctanoic acid), historically used to make Teflon cookware.
Today, both chemicals are recognised internationally as being toxic to humans and wildlife and have been discontinued (or are being progressively phased out) in many countries, including Australia.
Refer (ABC Health News PFAS 'forever chemicals' are all around us. What does it mean for our health? - ABC News)

Aquatic ecosystems	
Indicator	Numerical criteria (trigger values)
Total phosphorus 10 µg/L	• Upland rivers: 20 µg/L • Lowland rivers: 25 µg/L for rivers flowing to the coast; • Lakes & reservoirs: 10 µg/L • Estuaries: 30 µg/L
Total nitrogen 400 µg/L	• Upland rivers: 250 µg/L • Lowland rivers: 350 µg/L for rivers flowing to the coast; • Lakes & reservoirs: 350 µg/L • Estuaries: 300µg/L
Chlorophyll-a	• Upland rivers: not applicable • Lowland rivers: 5 µg/L • Lakes & reservoirs: 5 µg/L. • Estuaries: 4 µg/L.
Turbidity 17.53 NTU	• Upland rivers: 2–25 NTU (see supporting information) • Lowland rivers: 6–50 NTU (see supporting information) • Lakes & reservoirs: 1–20 NTU • Estuaries: 0.5–10 NTU
Salinity (electrical conductivity) 590 µS/cm	• Upland rivers: 30–350 µS/cm • Lowland rivers: 125–2200 µS/cm supporting information
Dissolved oxygen 10.19 ppm	• Upland rivers: 90–110% • Lowland rivers: 85–110% • Freshwater lakes & reservoirs: 90–110% • Estuaries: 80–110% Note: Dissolved oxygen values were derived from daytime measurements. Dissolved oxygen concentrations may vary diurnally and with depth. Monitoring programs should assess this potential variability.
pH 8.32	• Upland rivers: 6.5–8.0 • Lowland rivers: 6.5–8.5 • Freshwater lakes & reservoirs: 6.5–8.0 • Estuaries: 7.0–8.5 Changes of more than 0.5 pH units from the natural seasonal maximum or minimum should be investigated.

Map Image 5. Stormwater Testing Site OP-5 – Basin 5 – MPW



STORMWATER DISCHARGE TESTING SITE

BASIN 5 – OUTFLOW

Site image 1. Testing site Basin OSD-5 – Discharge to the Georges River

Water Quality Monitoring Comparative Table (Temporal)

Table 4. Retention Basin 5 MPW. Testing Site MPW 5 Outflow

Testing Site MPW Outflow	May 2024 baseline	October 2024	April 2025	Nov 2025
pH	6.39	6.21	8.32	7.48
Dissolved Oxygen - %/L	4.11mg/L	10.5	10.19	5.3mg/L
Actual Electronic Conductivity	0.054945	0.008	93.5 ORP mV	147.2 ORP mV
Temperature - ℃	18.12	19.5	21.9	24.1
Turbidity	0.03 NTU	6.62	17.53	8.04 NTU
Total phosphorous - mg/L	0.04 mg/L	0.03	<0.01	0.21mg/L
Total nitrogen - mg/L	1.7 mg/L	0.4	0.4	1.1mg/L
Kjeldahl nitrogen mg/L	1.0 mg/L	0.4	0.3	1.0 mg/L
Dissolved metals				
Arsenic	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	<0.001	<0.001	<0.001	<0.001
Copper	0.017	<0.001	0.005	0.007
Nickel	0.001	<0.001	0.001	0.001
Lead	<0.001	<0.001	<0.001	<0.001
Zinc	<0.005	0.008	<0.005	<0.005
Mercury	<0.0001	<0.0001	<0.0001	<0.0001
PFAS				
Lab results – SUM of PFAS Micrograms/L	0.13	0.04	0.08	<0.01
SUM of PFHxS & PFOS Microgrms/L	0.04	0.04	0.01	<0.01
Total suspended solids mg/L	6	<5	10	<5
Total hydrocarbons				
Benzene	<1	<1	<1	<1
Toluene	<2	<2	<2	<2
Ethylbenzene	<2	<2	<2	<2
meta-& para-Xylene	<2	<2	<2	<2
Ortho-Xylene	<2	<2	<2	<2
Total Xylenes	<2	<2	<2	<2
Sum of BTEX	<1	<1	<1	<1
Naphthalene	<5	<5	<5	<5

Results

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B50	IP1	IP3	DP1	B60
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00
Compound	CAS Number	LOR	Unit		ES2537469-001	ES2537469-002	ES2537469-003	ES2537469-004	ES2537469-005
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	---	5	mg/L		<5	5	48	<5	28
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	0.002	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		0.007	<0.001	0.002	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	0.049	0.240	<0.005	<0.005
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	---	0.01	mg/L		0.03	0.12	<0.01	<0.01	0.09
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	---	0.1	mg/L		0.3	1.2	1.1	0.4	0.9
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	---	0.1	mg/L		0.3	1.3	1.1	0.4	1.0
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	---	0.01	mg/L		0.02	0.06	0.11	0.06	0.09
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	---	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	---	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	---	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	---	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	---	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B50	IP1	IP3	DP1	B60
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00
Compound	CAS Number	LOR	Unit		ES2537469-001	ES2537469-002	ES2537469-003	ES2537469-004	ES2537469-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	**0.04**	**0.03**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	**0.04**	**0.03**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	**0.16**	**0.10**	**0.03**	**0.15**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	**0.08**	**0.03**	**0.02**	**0.18**
Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B50	IP1	IP3	DP1	B60
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00
Compound	CAS Number	LOR	Unit		ES2537469-001	ES2537469-002	ES2537469-003	ES2537469-004	ES2537469-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	**0.04**	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	**0.14**	**0.09**	**0.03**	**0.05**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	**0.03**	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	**0.05**	**0.03**	<0.01	**0.01**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorohexadecanoic acid (PFHxDA)	67905-19-5	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B50	IP1	IP3	DP1	B60
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00
Compound	CAS Number	LOR	Unit		ES2537469-001	ES2537469-002	ES2537469-003	ES2537469-004	ES2537469-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	---	0.01	µg/L		<0.01	0.58	0.31	0.08	0.39
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	0.24	0.13	0.05	0.33
Sum of PFAS (WA DER List)	---	0.01	µg/L		<0.01	0.54	0.28	0.08	0.39
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		77.5	80.0	88.1	80.2	117
Toluene-D8	2037-26-5	2	%		100	98.7	102	96.3	98.5
4-Bromofluorobenzene	460-00-4	2	%		112	111	109	100	123
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%		87.9	84.6	84.8	86.0	83.1
13C8-PFOA	---	0.02	%		89.5	88.1	87.5	87.9	87.1

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Work Order : ES2537469
Client : Apical Bushfire and Planning
Project : ----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	B6I	B5I	B8O	B8I	----
			Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	---
Compound	CAS Number	LOR	Unit	ES2537469-006	ES2537469-007	ES2537469-008	ES2537469-009	-------
				Result	Result	Result	Result	---
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	13	199	6	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	<0.001	0.003	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.002	----
Copper	7440-50-8	0.001	mg/L	0.003	<0.001	0.001	0.005	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	0.004	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	0.012	<0.005	0.006	<0.005	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.05	0.12	0.04	0.16	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	1.0	0.6	1.7	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.0	1.1	0.6	1.9	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.09	0.21	0.05	0.04	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B6I	B5I	B8O	B8I	----
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	----
Compound	CAS Number	LOR	Unit		ES2537469-006	ES2537469-007	ES2537469-008	ES2537469-009	-------
					Result	Result	Result	Result	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	<0.01	**0.03**	**0.02**	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	**0.01**	**0.03**	**0.03**	----
Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B6I	B5I	B8O	B8I	----
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	----
Compound	CAS Number	LOR	Unit		ES2537469-006	ES2537469-007	ES2537469-008	ES2537469-009	-------
					Result	Result	Result	Result	----
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	**0.03**	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	**0.02**	**0.07**	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	**0.01**	**0.01**	**0.03**	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
Perfluorohexadecanoic acid (PFHxDA)	67905-19-5	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B6I	B5I	B8O	B8I	----
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	----
Compound	CAS Number	LOR	Unit		ES2537469-006	ES2537469-007	ES2537469-008	ES2537469-009	-------
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	0.02	0.09	0.18	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	0.01	0.06	0.05	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	0.02	0.09	0.18	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		79.7	106	81.4	80.5	----
Toluene-D8	2037-26-5	2	%		100	81.9	98.5	99.2	----
4-Bromofluorobenzene	460-00-4	2	%		113	106	111	104	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		83.2	84.6	83.4	84.7	----
13C8-PFOA	----	0.02	%		86.6	87.2	86.0	85.5	----

Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Appendix B. ANZECC & ARMCANZ (2000) water quality guidelines

Table 3.4.1 Trigger values for toxicants at alternative levels of protection. Values in grey shading are the trigger values applying to typical *slightly–moderately disturbed systems*; see table 3.4.2 and Section 3.4.2.4 for guidance on applying these levels to different ecosystem conditions.

Chemical		Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
		Level of protection (% species)				Level of protection (% species)			
		99%	95%	90%	80%	99%	95%	90%	80%
METALS & METALLOIDS									
Aluminium	pH >6.5	27	55	80	150	ID	ID	ID	ID
Aluminium	pH <6.5	ID	ID	ID	ID	ID	ID	ID	ID
Antimony		ID	ID	ID	ID	ID	ID	ID	ID
Arsenic (As III)		1	24	94 [C]	360 [C]	ID	ID	ID	ID
Arsenic (AsV)		0.8	13	42	140 [C]	ID	ID	ID	ID
Beryllium		ID	ID	ID	ID	ID	ID	ID	ID
Bismuth		ID	ID	ID	ID	ID	ID	ID	ID
Boron		90	370 [C]	680 [C]	1300 [C]	ID	ID	ID	ID
Cadmium	H	0.06	0.2	0.4	0.8 [C]	0.7 [B]	5.5 [B, C]	14 [B, C]	36 [B, A]
Chromium (Cr III)	H	ID	ID	ID	ID	7.7	27.4	48.6	90.6
Chromium (CrVI)		0.01	1.0 [C]	6 [A]	40 [A]	0.14	4.4	20 [C]	85 [C]
Cobalt		ID	ID	ID	ID	0.005	1	14	150 [C]
Copper	H	1.0	1.4	1.8 [C]	2.5 [C]	0.3	1.3	3 [C]	8 [A]
Gallium		ID	ID	ID	ID	ID	ID	ID	ID
Iron		ID	ID	ID	ID	ID	ID	ID	ID
Lanthanum		ID	ID	ID	ID	ID	ID	ID	ID
Lead	H	1.0	3.4	5.6	9.4 [C]	2.2	4.4	6.6 [C]	12 [C]
Manganese		1200	1900 [C]	2500 [C]	3600 [C]	ID	ID	ID	ID
Mercury (inorganic)	B	0.06	0.6	1.9 [C]	5.4 [A]	0.1	0.4 [C]	0.7 [C]	1.4 [C]
Mercury (methyl)		ID	ID	ID	ID	ID	ID	ID	ID
Molybdenum		ID	ID	ID	ID	ID	ID	ID	ID
Nickel	H	8	11	13	17 [C]	7	70 [C]	200 [A]	560 [A]
Selenium (Total)	B	5	11	18	34	ID	ID	ID	ID
Selenium (SeIV)	B	ID	ID	ID	ID	ID	ID	ID	ID
Silver		0.02	0.05	0.1	0.2 [C]	0.8	1.4	1.8	2.6 [C]
Thallium		ID	ID	ID	ID	ID	ID	ID	ID
Tin (inorganic, SnIV)		ID	ID	ID	ID	ID	ID	ID	ID
Tributyltin (as µg/L Sn)		ID	ID	ID	ID	0.0004	0.006 [C]	0.02 [C]	0.05 [C]
Uranium		ID	ID	ID	ID	ID	ID	ID	ID
Vanadium		ID	ID	ID	ID	50	100	160	280
Zinc	H	2.4	8.0 [C]	15 [C]	31 [C]	7	15 [C]	23 [C]	43 [C]
NON-METALLIC INORGANICS									
Ammonia	D	320	900 [C]	1430 [C]	2300 [A]	500	910	1200	1700
Chlorine	E	0.4	3	6 [A]	13 [A]	ID	ID	ID	ID
Cyanide	F	4	7	11	18	2	4	7	14
Nitrate	J	17	700	3400 [C]	17000 [A]	ID	ID	ID	ID
Hydrogen sulfide	G	0.5	1.0	1.5	2.6	ID	ID	ID	ID
ORGANIC ALCOHOLS									
Ethanol		400	1400	2400 [C]	4000 [C]	ID	ID	ID	ID
Ethylene glycol		ID	ID	ID	ID	ID	ID	ID	ID
Isopropyl alcohol		ID	ID	ID	ID	ID	ID	ID	ID
CHLORINATED ALKANES									
Chloromethanes									
Dichloromethane		ID	ID	ID	ID	ID	ID	ID	ID
Chloroform		ID	ID	ID	ID	ID	ID	ID	ID
Carbon tetrachloride		ID	ID	ID	ID	ID	ID	ID	ID
Chloroethanes									
1,2-dichloroethane		ID	ID	ID	ID	ID	ID	ID	ID
1,1,1-trichloroethane		ID	ID	ID	ID	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
1,1,2-trichloroethane	5400	6500	7300	8400	140	1900	5800 [C]	18000 [C]
1,1,2,2-tetrachloroethane	ID	ID	ID	ID	ID	ID	ID	ID
Pentachloroethane	ID	ID	ID	ID	ID	ID	ID	ID
Hexachloroethane B	290	360	420	500	ID	ID	ID	ID
Chloropropanes								
1,1-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
1,2-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
CHLORINATED ALKENES								
Chloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1-dichloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1,2-trichloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1,2,2-tetrachloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
3-chloropropene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloropropene	ID	ID	ID	ID	ID	ID	ID	ID
ANILINES								
Aniline	8	250 [A]	1100 [A]	4800 [A]	ID	ID	ID	ID
2,4-dichloroaniline	0.6	7	20	60 [C]	ID	ID	ID	ID
2,5-dichloroaniline	ID	ID	ID	ID	ID	ID	ID	ID
3,4-dichloroaniline	1.3	3	6 [C]	13 [C]	85	150	190	260
3,5-dichloroaniline	ID	ID	ID	ID	ID	ID	ID	ID
Benzidine	ID	ID	ID	ID	ID	ID	ID	ID
Dichlorobenzidine	ID	ID	ID	ID	ID	ID	ID	ID
AROMATIC HYDROCARBONS								
Benzene	600	950	1300	2000	500 [C]	700 [C]	900 [C]	1300 [C]
Toluene	ID	ID	ID	ID	ID	ID	ID	ID
Ethylbenzene	ID	ID	ID	ID	ID	ID	ID	ID
o-xylene	200	350	470	640	ID	ID	ID	ID
m-xylene	ID	ID	ID	ID	ID	ID	ID	ID
p-xylene	140	200	250	340	ID	ID	ID	ID
m+*p*-xylene	ID	ID	ID	ID	ID	ID	ID	ID
Cumene	ID	ID	ID	ID	ID	ID	ID	ID
Polycyclic Aromatic Hydrocarbons								
Naphthalene	2.5	16	37	85	50 [C]	70 [C]	90 [C]	120 [C]
Anthracene B	ID	ID	ID	ID	ID	ID	ID	ID
Phenanthrene B	ID	ID	ID	ID	ID	ID	ID	ID
Fluoranthene B	ID	ID	ID	ID	ID	ID	ID	ID
Benzo(a)pyrene B	ID	ID	ID	ID	ID	ID	ID	ID
Nitrobenzenes								
Nitrobenzene	230	550	820	1300	ID	ID	ID	ID
1,2-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,4-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3,5-trinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-methoxy-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-methoxy-4-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-3-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-4-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-2,4-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,2-dichloro-3-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloro-5-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,4-dichloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
2,4-dichloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Hexazinone	ID	ID	ID	ID	ID	ID	ID	ID
Simazine	0.2	3.2	11	35	ID	ID	ID	ID
Urea herbicides								
Diuron	ID	ID	ID	ID	ID	ID	ID	ID
Tebuthiuron	0.02	2.2	20	160 [C]	ID	ID	ID	ID
Miscellaneous herbicides								
Acrolein	ID	ID	ID	ID	ID	ID	ID	ID
Bromacil	ID	ID	ID	ID	ID	ID	ID	ID
Glyphosate	370	1200	2000	3600 [A]	ID	ID	ID	ID
Imazethapyr	ID	ID	ID	ID	ID	ID	ID	ID
Ioxynil	ID	ID	ID	ID	ID	ID	ID	ID
Metolachlor	ID	ID	ID	ID	ID	ID	ID	ID
Sethoxydim	ID	ID	ID	ID	ID	ID	ID	ID
Trifluralin B	2.6	4.4	6	9 [A]	ID	ID	ID	ID
GENERIC GROUPS OF CHEMICALS								
Surfactants								
Linear alkylbenzene sulfonates (LAS)	65	280	520 [C]	1000 [C]	ID	ID	ID	ID
Alcohol ethoxyolated sulfate (AES)	340	650	850 [C]	1100 [C]	ID	ID	ID	ID
Alcohol ethoxylated surfactants (AE)	50	140	220	360 [C]	ID	ID	ID	ID
Oils & Petroleum Hydrocarbons	ID	ID	ID	ID	ID	ID	ID	ID
Oil Spill Dispersants								
BP 1100X	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 7664	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 8667		ID	ID	ID	ID	ID	ID	ID
Corexit 9527	ID	ID	ID	ID	230	1100	2200	4400 [A]
Corexit 9550	ID	ID	ID	ID	ID	ID	ID	ID

Notes: Where the final water quality guideline to be applied to a site is below current analytical practical quantitation limits, see Section 3.4.3.3 for guidance.

Most trigger values listed here for metals and metalloids are *High reliability* figures, derived from field or chronic NOEC data (see 3.4.2.3 for reference to Volume 2). The exceptions are *Moderate reliability* for freshwater aluminium (pH >6.5), manganese and marine chromium (III).

Most trigger values listed here for non-metallic inorganics and organic chemicals are *Moderate reliability* figures, derived from acute LC_{50} data (see 3.4.2.3 for reference to Volume 2). The exceptions are *High reliability* for freshwater ammonia, 3,4-DCA, endosulfan, chlorpyrifos, esfenvalerate, tebuthiuron, three surfactants and marine for 1,1,2-TCE and chlorpyrifos.

* = *High reliability* figure for esfenvalerate derived from mesocosm NOEC data (no alternative protection levels available).

A = Figure may not protect key test species from acute toxicity (and chronic) — check Section 8.3.7 for spread of data and its significance. 'A' indicates that trigger value > acute toxicity figure; note that trigger value should be <1/3 of acute figure (Section 8.3.4.4).

B = Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered (see Sections 8.3.3.4 and 8.3.5.7).

C = Figure may not protect key test species from chronic toxicity (this refers to experimental chronic figures or geometric mean for species) — check Section 8.3.7 for spread of data and its significance. Where grey shading and 'C' coincide, refer to text in Section 8.3.7.

D = Ammonia as TOTAL ammonia as [NH_3-N] at pH 8. For changes in trigger value with pH refer to Section 8.3.7.2.

E = Chlorine as total chlorine, as [Cl]; see Section 8.3.7.2.

F = Cyanide as un-ionised HCN, measured as [CN]; see Section 8.3.7.2.

G = Sulfide as un-ionised H_2S, measured as [S]; see Section 8.3.7.2.

H = Chemicals for which algorithms have been provided in table 3.4.3 to account for the effects of hardness. The values have been calculated using a hardness of 30 mg/L $CaCO_3$. These should be adjusted to the site-specific hardness (see Section 3.4.3).

J = Figures protect against toxicity and do not relate to eutrophication issues. Refer to Section 3.3 if eutrophication is the issue of concern.

ID = Insufficient data to derive a reliable trigger value. Users advised to check if a low reliability value or an ECL is given in Section 8.3.7.

T = Tainting or flavour impairment of fish flesh may possibly occur at concentrations below the trigger value. See Sections 4.4.5.3/3 and 8.3.7.

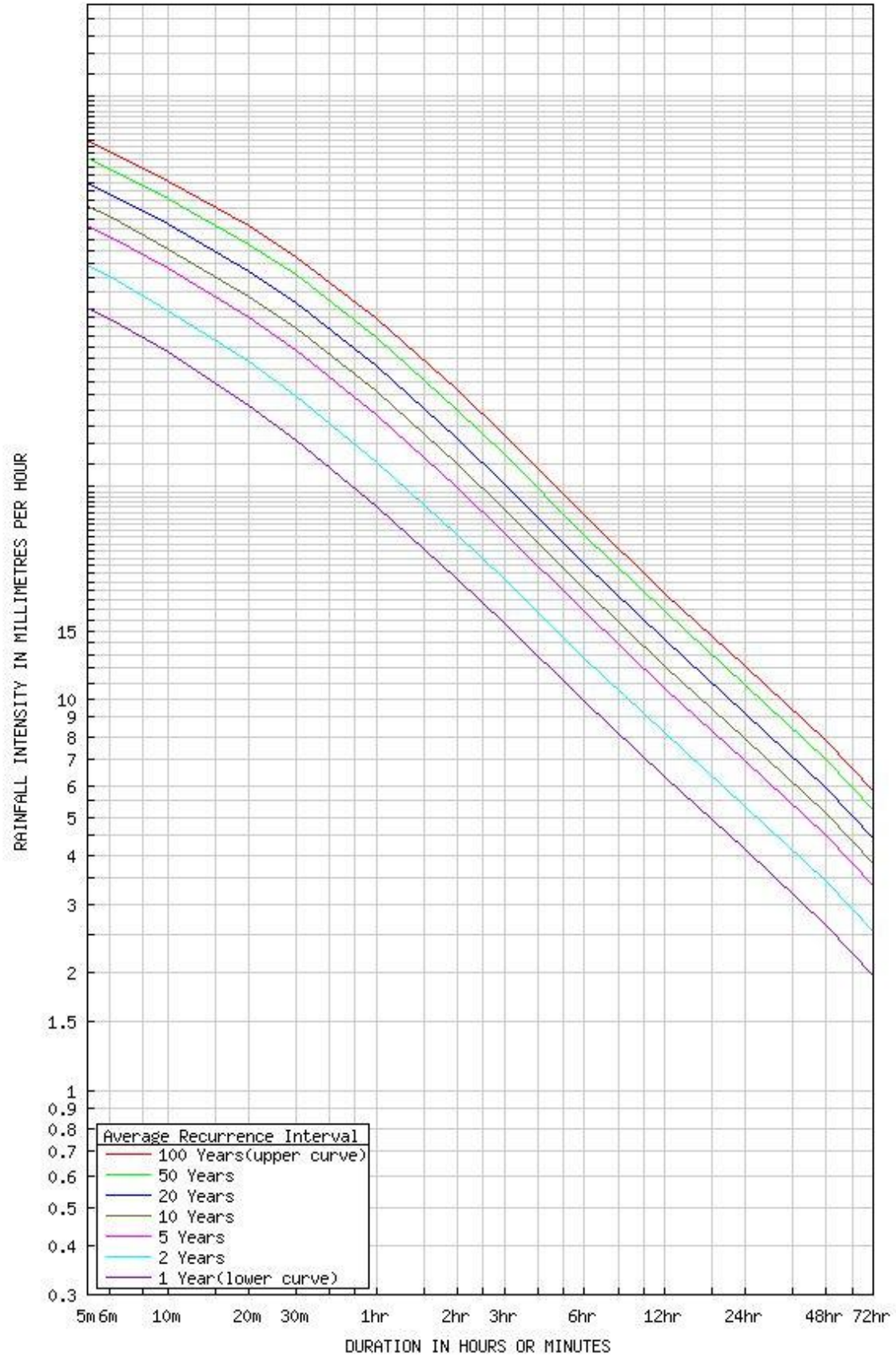
Table 5. Ecological water quality guideline values developed by water regulators

Exposure scenario	PFOS	PFOA	Exposure scenario	Comments and source
Freshwater	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	Australian and New Zealand Guidelines for Fresh and Marine Water Quality - technical draft default guideline values for PFOS and PFOA. Note 1: The 99% species protection level for PFOS is close to the level of detection. Agencies may wish to apply a 'detect' threshold in such circumstances rather than a quantified measurement. Note 2: The draft guidelines do not account for effects which result from the biomagnification of toxicants in air-breathing animals or in animals which prey on aquatic organisms. Note 3: The WQGs advise[41] that the 99% level of protection be used for slightly to moderately disturbed systems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. Regulators may specify or environmental legislation may prescribe the level of species protection required, rather than allowing for case-by-case assessments.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	
Interim marine	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	As above. Freshwater values are to be used on an interim basis until final marine guideline values can be set using the nationally-agreed process under the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Note 1: The WQG advise that in the case of estuaries, the most stringent of freshwater and marine criteria apply, taking account of any available salinity correction. Note 2: Marine guideline values developed by CRC CARE are under consideration through the nationally-agreed water quality guideline development process.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	

https://www.waterquality.gov.au/sites/default/files/documents/ANZECC-1992-guidelines.pdf

Type of indicator	Indicator	Units	Fresh waters	Marine waters
	Dissolved oxygen[2]	mg/L	> 6 (> 80–90% saturation)	> 6 (> 80–90% saturation)
	Nutrients/nuisance growths	–	(Section 2.3.3)	(Section 2.3.3)
	pH	–	6.5–9.0	< 0.2 pH unit change
	Salinity	mg/L	< 1000 (about 1,500 µS/cm)	–
	Suspended particulate matter/turbidity	–	< 10% change seasonal mean concentration (see also colour & clarity)	< 10% change seasonal mean concentration (see also colour & clarity)
	Temperature[3]	–	< 2°C increase	< 2°C increase
Toxicants				
Inorganic toxicants	Aluminium	µg/L	< 5.0 (if pH < = 6.5)	NR
	Aluminium	µg/L	< 100.0 (if pH > 6.5)	–
	Ammonia	µg/L	20.0–30.0 (Table 2.3)	NR
	Antimony	µg/L	30.0	500.0
	Arsenic	µg/L	50.0	50.0
	Beryllium	µg/L	4.0[4]	NR
	Cadmium	µg/L	0.2–2.0[5]	2.0
	Chromium	µg/L	10.0	50.0
	Copper	µg/L	2.0–5.0[5]	5.0
	Cyanide	µg/L	5.0	5.0
	Iron	µg/L	1,000.0[6]	NR
	Lead	µg/L	1.0–5.0[5]	5.0
	Mercury	µg/L	0.1	0.1
	Nickel	µg/L	15.0–150.0[5]	15.0
	Selenium	µg/L	5.0	70.0
	Silver	µg/L	0.1	1.0
	Sulfide	µg/L	2.0	2.0
	Thallium	µg/L	4.0	20.0
	Tin (tributyltin)	µg/L	0.008	0.002
	Zinc	µg/L	5.0–50.0[6]	50.0
Organic toxicants	Acrylonitrile	µg/L	NR	NR
	Benzidine	µg/L	NR	NR
	Dichlorobenzidine	µg/L	NR	NR
	Diphenylhydrazine	µg/L	NR	NR
Halogenated aliphatic compounds	Hexachlorobutadiene	µg/L	0.1	0.3
	Halogenated ethers	µg/L	NR	NR
	Isophorone	µg/L	NR	NR
Monocyclic aromatic compounds	Benzene	µg/L	300.0	300.0
	Chlorinated benzenes	µg/L	(Table 2.8)	NR

Appendix C. Intensity Frequency Duration – Average Recurrence Interval Indicator
Intensity-Frequency-Duration (bom.gov.au)



Moorebank Logistics Park West Precinct

Basin (OSD-6) Location

Stormwater Network Water Quality Monitoring Data & Reporting November 2025

Site image: SIOMP Inlet to Basin 6 (OSD-6) MPW (Apical image November 2025)

Prepared for: MID Plumbing P/L SIOMP Moorebank Precinct West (Spring 2025)

Prepared by: Daniel Anderson *(BEnvSc, MEnvSc)*

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PO Box 149 Kiama NSW 2533
ABN: 656 420 10 400

Consulted Documents / database.

Australia and New Zealand Guidelines for fresh and Marine Water Quality (2000)
NATIONAL WATER QUALITY MANAGEMENT STRATEGY - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) - Volume 2 - Aquatic ecosystems

Bureau of Meteorology – Australian Government Australia's official weather forecasts & weather radar - Bureau of Meteorology (bom.gov.au)

Moorebank Intermodal Precinct West – Stage 3 (SSD 10431) | Assessment Report March 2021
https://moorebankintermodalprecinct.com.au/wp-content/uploads/2023/04/MPW-S3-DPIE-assessment-report-to-IPC.pdf

WQM Report Western Precinct _Basin 5_Autumn 2024 – Apical Bushfire and Planning - April 2024

WQM Report Western Precinct _Basin 8_Spring 2024 – Apical Bushfire and Planning - October 2024

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 7709 Applicant: Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings Limited Consent Authority: The Independent Planning Commission Site: Moorebank Avenue, Moorebank Lot 1 DP 1197707 Lot 100 DP 1049508 Lot 101 DP 1049508 Lot 2 DP 1197707 Part Lot 3 DP 1197707 Part Anzac Road and Moorebank Avenue public road reserves Development: Moorebank Precinct West Stage 2 (MPW Stage 2)

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 10431 Applicant: Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings Limited Consent Authority: The Independent Planning Commission Site: Moorebank Avenue, Moorebank Lot 1 DP 1197707 Lot 100 DP 1049508 Lot 101 DP 1049508 Moorebank Precinct West Stage 3 (MPW Stage 3)

Australian Laboratory Services (ALS) Work Order EW2402561 Certificate of Analysis Water Sample Data 9th April 2025.

Liverpool DCP
Liverpool's Development Control Plans | Liverpool City Council (nsw.gov.au)

DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.
https://environment.gov.au/system/files/pages/dfb876c5-581e-48b7-868c-242fe69dad68/files/draft-environmental-mgt-guidance-pfos-pfoa.pdf

Development Consent SSD 7709 - Section 4.38 of the Environmental Planning and Assessment Act 1979
https://www.ipcn.nsw.gov.au/resources/pac/media/files/pac/projects/2019/05/moorebank-intermodal-precinct-west-stage-2/referral-from-department-of-planning-and-environment/revised-recommended-conditions/mpw-stage-2-recommended-conditions-inclusive-of-edits-191105.pdf

Glossary

The following definitions apply to terms used in this report. Many of these definitions are consistent with relevant national literature and cited where appropriate.

Current status trigger value
Concentrations of water quality indicators that reflect existing ecosystem condition, and therefore provide a target for ecosystem maintenance and a benchmark against which future water quality trends may be monitored.

Environmental value
Particular values or uses of the environment important for a healthy ecosystem or for public benefit, welfare, safety or health and requiring protection from the effects of pollution or degradation (Environment Australia 2002).

Indicator
A parameter (biological, physical or chemical) used to provide a measure of the quality of water or the condition of an ecosystem (Environment Australia 2002).

Low-risk trigger value
Concentrations (or loads) of key performance indicators [of water quality] at which if not exceeded, there is a low risk that adverse biological effects will occur (ANZECC 2000a).

Median
The middle reading, or 50th percentile, of all readings taken. i.e. of the readings 10, 13, 9, 16 and 11 (re-ordering these to read 9, 10, 11, 13 and 16), the median is 11. The mean (or average), is the sum of all values divided by the total number of readings (which in this case equals 11.8).

Reference condition
Refers to a site which is unmodified or minimally modified from 'natural' condition. Most commonly, reference sites are subject to limited disturbance from human activity. The reference condition then serves as a standard or target against which environmental change in other similar sites can be assessed.

Trigger value
A concentration that, if exceeded, would indicate a potential environmental problem, and so 'trigger' a management response, such as further investigation and/or remedial actions (ANZECC 2000a).

Water quality guideline
A numerical concentration level (e.g. of a contaminant) or narrative statement (e.g. visual appearance of a water body) recommended to support and maintain a designated water use (ANZECC 2000a)

1.1 Background

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 3 (the Project) of Moorebank Precinct West (MPW), which comprises the third stage of development within the Moorebank Precinct West under Development Approval SSD-10431.

The proposal is SSD under clause 19 of Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011, as it is development for the purpose of rail and related transport facilities.

The MPW site is located on the western side of Moorebank Avenue and forms the western section of the Moorebank Intermodal Precinct (Map Image 2).

The MPW site is approximately 2.5 kilometres (km) from the Liverpool city centre, 27 km south-west of the Sydney Central Business District (CBD) and 26 km west of Port Botany.

The MPW site is irregular in shape, approximately 3 km from north to south and 960 m from east to west at its widest point and covers an area of approximately 220 ha. It is situated between the Georges River to the west (with the SSFL running north-south to the west of the river); and Moorebank Avenue to the east.

Works on the MPW site to date have commenced under two current and active development consents:

• MPW Stage 1 early works, which provides demolition, rehabilitation, remediation of contaminated land, and the establishment of construction facilities and access including site security (as part of the SSD 5066 consent)

• MPW Stage 2, which provides for the construction and 24/7 operation of an intermodal facility and associated warehousing (SSD 7709).

This WQM period refers to Stage 2 development and partial operation of the site with active tenancy across buildings located to the MPW zone.

This water quality monitoring program is guided by the Stormwater Infrastructure Operation and Maintenance Plan (SIOMP) and is provided to site management on behalf of MID Plumbing.

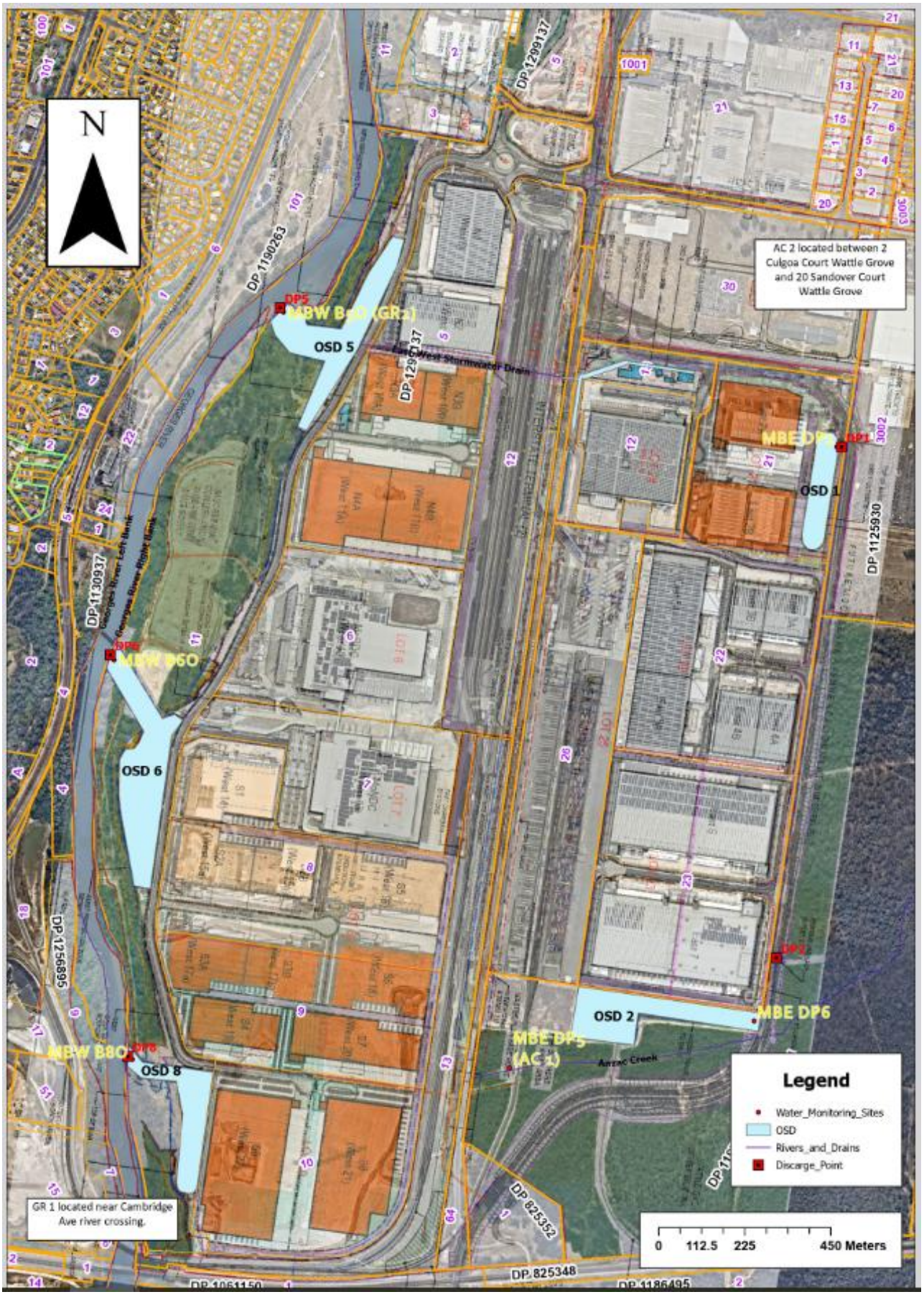
Three onsite bio-retention basins are present within Moorebank Precinct West. This report is in reference to baseline water quality condition reporting for Basin 5 (MPW – north).

Development Consent - Section 4.38 of the Environmental Planning and Assessment Act 1979 - Application Number: SSD 7709 Moorebank Precinct West Stage 2 (MPW Stage 2)

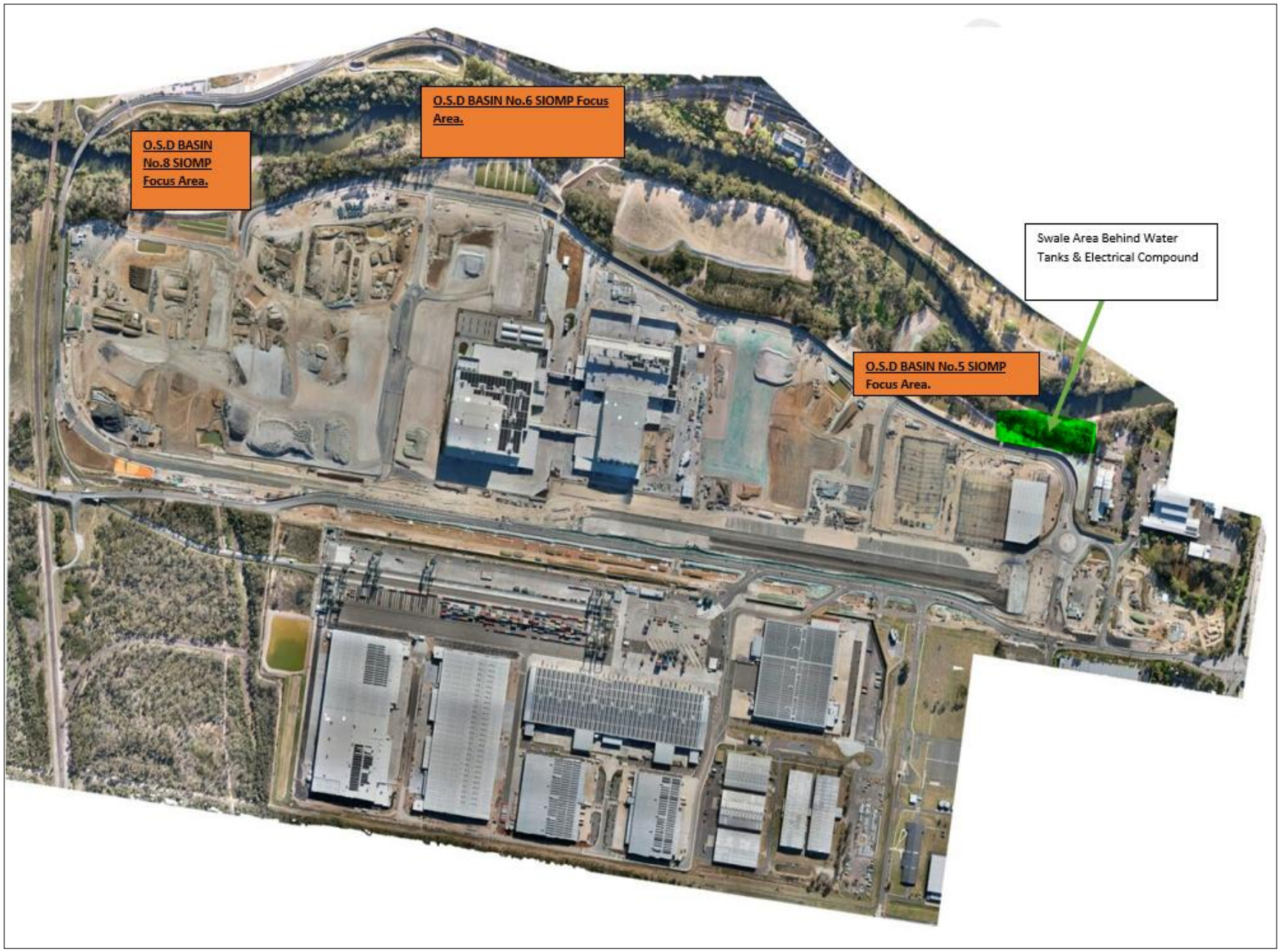
CoC	Requirement
Stormwater Quality Monitoring	
B38.	Stormwater Quality Monitoring Program - Prior to commencement of operation Part of the Operational Environmental Management Plan

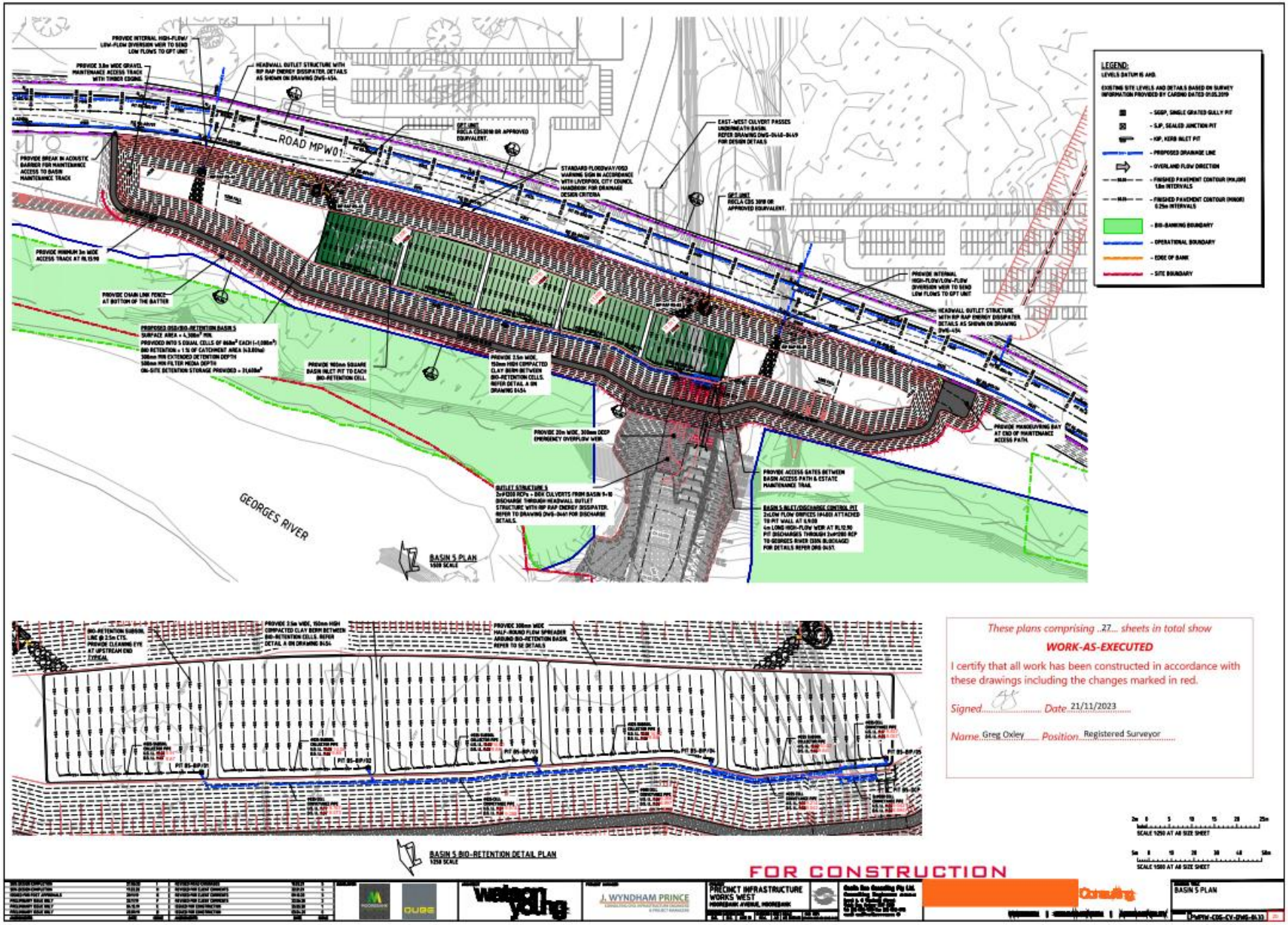
The Stormwater Infrastructure Operation and Maintenance Plan (SIOMP) Moorebank Logistics Park – West Precinct was developed to address the requirements of MPE stage 3 CoCs (SSD 7709). The management plan (SIOMP) identifies the operational drainage and environmental management measures within the stormwater management system that will be applied to activities undertaken across the MLP west Precinct to manage improved water quality objectives and overall functionality of the stormwater detention and drainage network associated with stormwater infrastructure upon the site under the SIOMP.

Map image 1. Overview subject site (MPW) provided by Arcadis



Map Image 2. Moorebank Precinct West Detention Basins (provided by MID Plumbing)

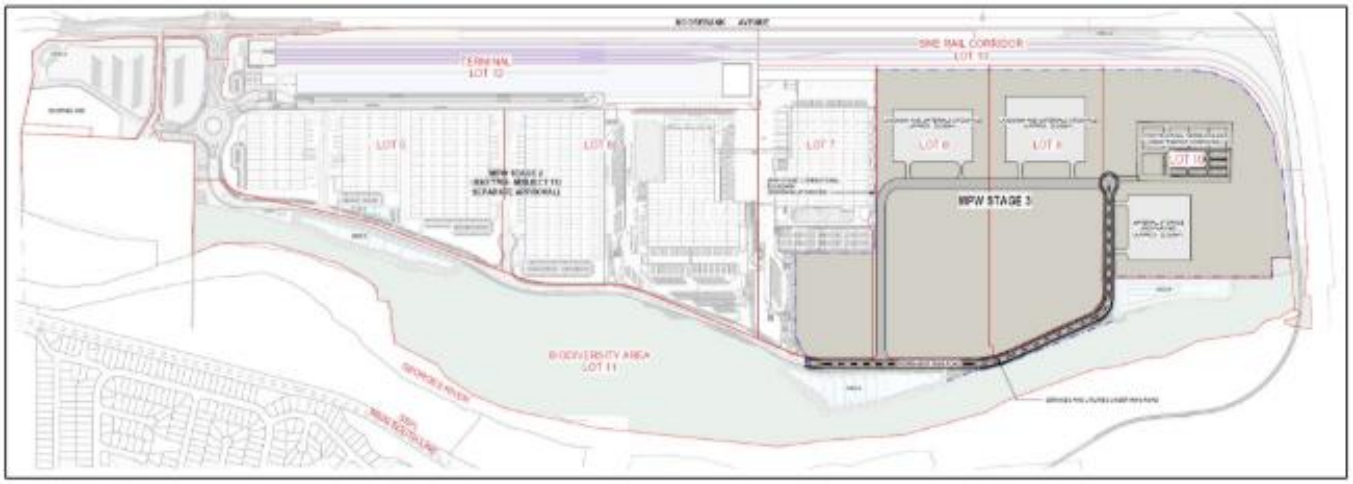




Map image 3. Detention Basin 5 MPW (north)

1.2 Reference information

Map image 4. Moorebank Intermodal Precinct West – Stage 3 State Significant Development



Assessment (SSD-10431) March 2021

20. Stormwater Management System or Works	That untreated stormwater is not disposed of into the Georges River or its tributaries. The likely impact of stormwater disposal on the quality of any receiving waters. That the levels of nutrients and sediments entering the waterway are not increased by the proposed development. Whether any proposals to manage stormwater are in accordance with the local council's stormwater management plans and the Managing Urban Stormwater series of documents and meet the local council's stormwater management objectives. Whether the principles outlined in the *Managing Urban Stormwater Soils and Construction Handbook* (1998) prepared by and available from Landcom and the Department of Housing are followed during each stage of a development (including subdivision).	Detailed stormwater assessments were undertaken as part of MPW Stage 2, and remain applicable to the Stage 3 proposal. The Department has recommended conditions that would enforce these requirements, by ensuring that appropriate measures are implemented to manage stormwater impacts during construction. In regard to management of stormwater during operation of the MPW site, the MPW Stage 2 proposal incorporates a robust set of conditions to manage the release of stormwater via six onsite detention basins (OSD), a major east-west covered culvert and associated drainage infrastructure.

2. Monitoring Program Methodology

2.1 Monitoring Sites

To support stormwater and drainage management of the facility the MLP West precinct has established a vast stormwater infrastructure system consisting of several Water Sensitive Urban Design (WSUD) functions including raingardens detention basins and bio-swales. These networks are designed to minimise the velocity and peak discharge of stormwater draining from the site and act as onsite detention basins to harvest and sequester potential pollutants generated at the site through designed biological processes.

The stormwater infrastructure system discharges water into the natural drainage system via three outlets:

- Basin 5 detains water from the northern section of MPW before discharging into Georges River
- Basin 6 detains water from the mid-section of MPW before discharging into Georges River
- Basin 8 detains water from the southern section of MPW before discharging into Georges River

Monitoring of the discharge points has been established via our ongoing program with MID Plumbing under the SIOMP program (MPE) to collect qualitative data and analyse the performance of the WSUD provisions and to establish any potential trends in water quality readings from the stormwater network discharge points prior to release of water into the natural hydrological systems of Anzac Creek and the Georges River.

This report constitutes the Spring 2025 water quality data alongside baseline data for Basin 5 (OSD-5) Moorebank Precinct West (MPW).

Table 1. Type of outlet MPW

Discharge Point (see figure 2)	Associated Outlet (see figure 1)	Type of outlet/detention basin
Basin 5	Inlet	Bio retention basin (holding)
	Outlet	Outlet point – rock ramp
	Georges River	River – natural drainage conveyance
Basin 6	Inlet	Bio retention basin (holding)
	Outlet	Outlet point – rock ramp
Basin 8	Inlet	Bio retention basin (holding)
	Outlet	Outlet point – rock ramp

2.2 Water Quality Assessment

Surface water quality data collected at the discharge points is assessed with reference to ANZECC Guidelines (2000) and correlated with baseline & Spring 2025 Water Quality monitoring results provided by previous condition assessment reports.

By comparing water test data under the program across the testing timeline we can identify and report upon trends, identify exceedances and exclude potential anomalies for datasets.

Water from OSD-5 is released to the Georges River a natural riverine system located to the southwest of the Sydney Basin.

Table 2. ANZECC Low Risk Trigger Values

Ecosystem type	Turbidity NTU	EC µS/cm	pH*	DO	TN mg/L	NO_x - N mg/L	NH_4^+ - N mg/L	TP mg/L	DRP - P mg/L
Upland river	2-25	30-350	6.5-7.5	90-110	0.480	0.190	0.013	0.013	0.005
Lowland river	6-50	125-2200	6.5-8.0	85-110	0.500	0.190	0.020	0.050	0.020

Values for Low Land River Systems as insert above are used as the reference guide to water quality parameter values and overall health and safety statements regarding the quality of discharged water from the SIOMP drainage network.

Annual spring and autumn water quality data presented from Anzac Creek and Georges River testing programs by other scientific consultants may also be cross referenced to the data prepared by Apical under the SIOMP program to establish potential trends in results and identify increases in accumulated pollutants from the site under operational condition, which may appear present within adjacent natural waterways.

Site data was collected in the form of water samples and in field data recordings at the prescribed monitoring points, water samples and water probe readings are undertaken following Australia and New Zealand guidelines for fresh and marine water quality – 2000 (ANZECC Guidelines), In situ water quality parameters relevant to stream health and aquatic assessment profiling were collected in field with a multiparameter hand-held water quality monitoring probe (Aquatroll 600).

Water data is collected, analysed and collated under the same methodologies and process under each testing period, the ensure consistency in the process.

Measures tested and samples taken:

- pH
- Dissolved Oxygen
- Electrical Conductivity
- Water Temperature and
- Turbidity

Water samples are collected at inlet and discharge points (Basin 5, Basin 6 & Basin 8) then sent to Australian Laboratory Services (ALS) for quality testing analysis Surface water (alsglobal.com).

Water analytical suites / testing parameters are provided to obtain overall water condition results and chemical sampling of collected water is undertaken for a range of nutrients, metals, and hydrocarbons relevant to stream health and aquatic assessment protocol, key nutrients, metals, and pollutants included in the assessment to reflect an overall suite of water quality condition guides which are listed below:

- Total phosphorous
- Total Nitrogen
- Kjeldahl Nitrogen
- Dissolved Metals
- PFAS
- Total Suspended Solids
- Total Hydrocarbons

The raw data results from the lab analysis provided to us by ALS Laboratory Services are presented within this report (see Appendix A).

Key water quality data attributes are recorded, tables and compared against; previous condition baseline data, Liverpool Development Control Plan (DCP) water quality targets, Conditions of Consent B40 and ANZECC Guideline (2000) trigger limits under the condition category 90% protection criteria for freshwater natural systems.

The water quality guidelines are applied to ensure adjacent natural waterways George River and Anzac creek are not adversely affected by poor water quality discharge from the Moorebank logistics park site and operations.

Trends observed in our datasets are analysed on a temporal scale with any trigger values for specific water quality measures highlighted and presented within the results chapter of each seasonal report. This report provides baseline & Spring 2024 data for Basin 5 (MPW) from which trend analysis will compound over

future reporting periods.

2.3 Data Analysis

The water quality measurements collected are used to assess water quality at each site in terms of health of aquatic ecosystems by comparison with guideline values recommended by the ANZECC and ARMCANZ (2000) guidelines for the protection of lowland streams (i.e. systems at < 150 m altitude) in south-east Australia. This categorisation for stream health is deemed relevant for the description of Anzac Creek, the recipient natural way due to the location in the geomorphic landscape and correlations of expected biophysical health and habitat profiles for similar stream environments.

2.4 Survey dates and personnel

On the 15th December 2025, ecologists from Apical Bushfire and Planning attended Moorebank Precinct West (MPW) to collect water quality data across the testing sites which are located within selected inlet points and discharge points within the stormwater drainage and management system (SIOMP) located within the Moorebank Logistics Park site West (See map image 2).

Inlet and outlet points within the network are representative of variant sites where stormwater will enter a node of the system (as a point source) and then release from the that node of the system at a discharge point. By recording inlet and discharge data water quality can be tracked along the continuum within the system to determine condition changes and overall trends in measured quality at given sites.

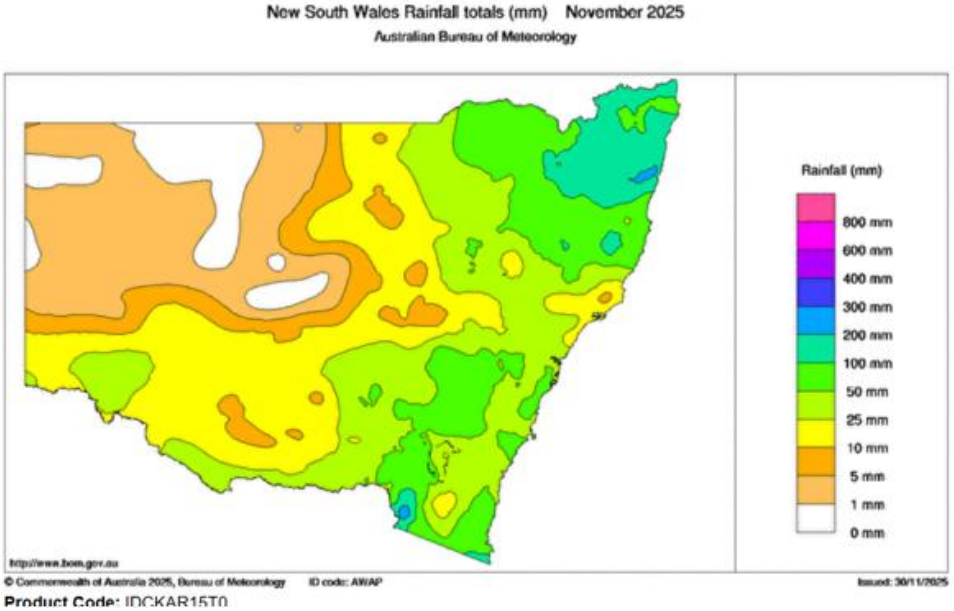
This data was collected on behalf of MID plumbing in accordance with 'The Stormwater Infrastructure Operation and Maintenance Plan Moorebank Logistics Park – West Precinct 2020' and in compliance with Condition of Consent B40 (Liverpool City) for the subject site. The results of such monitoring data collection are presented within this report.

2.5 Rainfall

Between the 1st of November and the 31st of November 2025 Moorebank received 61.6mm of rainfall.

NSW Monthly Rainfall November 2025

61.6 mm for the month in Holsworthy NSW.



3. Results

Data results captured by our water quality sampling are presented herein and are representative of baseline water quality results for Moorebank Precinct West Basin 5. Threshold guideline quantitative values for the water quality parameter themes are compared and correlated to ANZECC/ARMCANZ (2000) guidelines under the categorisation thresholds – Waterway benchmark group: 'The protection of slightly disturbed lowland river ecosystems in southeast Australia'.

As these are the first samples results collected under our scope for the SIOMP-MPW sites, the sampling results presented in this report will be considered for future analysis against subsequent results for use as baseline data for the drainage network SIOMP function.

B) 6-Inlet (OSD-6)

Measures	Results
Date & Time	26/11/2025 – 10.23am
Temperature	26.4
Dissolved Oxygen %	112
Dissolved Oxygen mg/L	9.0
Salinity SPC ms/cm	0.165
Salinity C-ms/cm	170
TDS mg/L Total Dissolved Solids	108
pH	8.39
ORP mV Oxidation reduction potential	172.7
NTU	-4.40

Collection Site B) 6 Basin inlet

B) 6-0utlet (OSD-6)

Measures	Results
Date & Time	26/11/2025 – 10.48am
Temperature	21.1
Dissolved Oxygen %	107
Dissolved Oxygen mg/L	9.5
Salinity SPC ms/cm	0.411
Salinity C-ms/cm	380.8
TDS mg/L Total Dissolved Solids	267
pH	8.37
ORP mV Oxidation reduction potential	175.7
NTU	3.66

Nitrogen

Reporting period	ANZECC Guideline*	April 2025	Nov 2025
Nitrogen µg/L	350 µg/L	600 µg/L	900 µg/L

***** ANZECC 2000 Guidelines 350 µg/L for rivers flowing to the coast

Phosphorus

Reporting period	ANZECC Guideline*	April 2025	Nov 2025
Phosphorous µg/L	50 µg/L	30 µg/L	90 µg/L

***** ANZECC 2000 Guidelines 50 µg/L for rivers flowing to the coast

Testing period	Trigger Value
Nitrogen µg/L	350 µg/L for rivers
Phosphorous	25 µg/L - 50 µg/L

µg/L	

Location Basin 6 Outflow

Nitrogen 900 µg/L (Guideline trigger 350 µg/L)

Phosphorus 90 µg/L (Guideline trigger 50 µg/L)

Both Nitrogen and Phosphorus are exceeding the ANZECC baseline values during this testing period.

Consideration must be given to low water volume in the outflow and shallowing puddling of the water sample medium which would contribute to higher concentration reading for these nutrient values.

Metals

Testing period	Trigger value ANZECC	Nov 2025		
Copper mg/L	0.0014 mg/L	0.007		
Zinc mg/L	0.008 mg/L	<0.005		
Arsenic mg/L	0.03 mg/L	<0.001		
Cadmium	0.05 µg/L	<0.0001		
Chromium	5 µg/L	<0.001		
Nickle	0.1 µg/L	<0.001		
Lead	0.005 mg/L	<0.001		

Concentrations for dissolved metals are under the ANZECC guidelines for all listed soluble metals.

Results for these parameters are considered positive for WQM discharges at the outlet and demonstrate that soluble metals are being captured throughout the SIOMP network reducing mobilisation and accretion into the natural waterways.

Total Suspended Solids

TSS results appear stabilised over the April and November testing period, the levels are under the trigger values Values are below the ANZECC guidelines and considered acceptable.

Testing period	EPA trigger value	April 2025	Nov 2025	
TSS mg/L	50 mg/L	11mg/L	28 mg/L	

pH

pH values fall within the desirable range at the discharge location, albeit the reading is at the top of the range for alkalinity.

Testing	Trigger Value - ANZECC 2000 Guidelines *Lowland rivers	April 2025	Nov 2025		
pH	Min 6.5 Max 8.5	8.08	8.37		

PFAS;

OSD -5 - PFAS – Qube Logistics, Moorebank, NSW			
PFAS Surrogate	**Measure** µg/L	**95% species protection (DEE 2016)**	**Triggered**
13C4-PFOS % **Sum of PFAS**	83.1 % 0.39 (µg/L)	.13 (µg/L)	Y
13C8-PFOA % **Sum of PFHxS and PFOS**	87.1 % 0.02 (µg/L)	220 (µg/L)	N
Notes: This Guidance focuses on PFOS and PFOA as potential indicators of wider contamination by related PFASs. The reasons for this approach include: • Most research undertaken on PFASs internationally and in Australia has focused on PFOS and PFOA due to their frequent occurrence in the environment, persistence, and bioaccumulation. • PFOS and PFOA can also be the breakdown endpoint of other precursor products. • PFOS and PFOA are the most commonly encountered PFAS in the environment and wildlife. • Information on other PFASs, of which there are several hundred known, is more limited. • Effective management of PFOS and PFOA may help address potential contamination where other PFASs may also be present. * DEE 2016. Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA). Department of the Environment and Energy.			

PFAS concentrations exceed the guideline values for PFOS and occur at 0.02 (µg/L) for PFOA.

Total Hydrocarbons

OSD-5 - Total hydrocarbons – Qube Logistics, Moorebank, NSW

Total Hydrocarbons assessed alongside baseline data (2018) and Spring monitoring (2025) for Aquatic Monitoring location 11&12 (AQ11 & AQ12 Anzac Creek).

Lab results - Total hydrocarbons:	**Trigger value ANZECC Guidelines 2000 – slightly disturbed lowland river ecosystem**	**Triggered**	**Baseline monitoring April 2018 (presented by Biosis)**	**November 2025**					
Benzene µg/L	1300 µg/L	N	<1	<1					
Toluene µg/L	-	N	<2	<2					
Ethylbenzene µg/L	-	N	<2	<2					
meta-& para-Xylene µg/L	200 µg/L	N	-	<2					
Ortho-Xylene µg/L	470 µg/L	N	<2	<2					
Total Xylenes µg/L	-	N	-	<2					
Sum of BTEX µg/L	-	N	-	<1					
Naphthalene µg/L	85 µg/L	N	-	<5					
			Notes: • The data were compared to the default trigger values (DTVs) recommended by ANZECC/ARMCANZ (2000) for the protection of slightly disturbed lowland river ecosystems in southeast Australia. • Moorebank Precinct East Stage 2: Biodiversity Monitoring in Anzac Creek Autumn						

		2019 Survey - Final Report, Bio-Analysis Pty Ltd (2019) • Moorebank Precinct East - Stage 2 B106 – Baseline Aquatic Ecological Monitoring Report and Biodiversity Monitoring Strategy (SSD 7628) Biosis (2018) • A commonly encountered example of additive toxicity of mixtures is the simple aromatic hydrocarbons commonly associated with contaminated petroleum sites, benzene, toluene, ethyl benzene and xylenes, collectively known as BTEX

Total hydrocarbons are recorded within the baseline parameter values and have not changed across this testing period to other prior results.

3.2 Interpreting Results

Phosphorous Values

Phosphorus

Phosphorus rates from this testing period are considered above the Anzecc guidelines.

Stormwater runoff is a major cause of physical, chemical (i.e. nutrients), and microbial degradation of receiving waters. Nitrogen (N) and phosphorus (P) are of particular concern and interest in urban stormwater runoff due to their role in eutrophication of water bodies, onset of harmful algal blooms, and fish kills. refer (Yun-Ya Yang & Gurpal S. Toor)

The linkages between urbanization and increased N and P export is well established; however, the contributions and dynamics of N and P are often site-specific, the synchronicity between N and P in aquatic environment has been widely used as an ecological indicator of biological growth and nutrient limitation.

Understanding P dynamics in stormwater runoff can help to implement and enhance the effectiveness of strategies to control P loss and transport to receiving waters.

P values from this testing period were slightly raised above the ANZECC guidelines, however are considered reasonable for the testing environment and sample pool.

Nitrogen Values

Nitrogen

Nitrogen values are above the guideline rates, however this is a reduction in concentration when compared to the samples of October 2024, which provides an improvement in nitrogen concentration.

Five (5) Industrial Applications of Nitrogen

While the main industrial use of nitrogen is to create ammonia that is required for fertilizer, explosives, and other materials, it uses go far beyond these applications. From food packaging to pharmaceuticals, nitrogen gas can be found in more places and used for more purposes than you may have realized.

Food Packaging: It is common practice for food processing companies to use compressed nitrogen to displace oxygen in the packaging of perishable foods. Without oxygen, the shelf life of foods such as meats, fruits, vegetables, and various snack foods can be extended. Nitrogen can also add a cushion around food to keep it safe during transport.

Chemical Blanketing: Nitrogen is typically used to prevent fires and explosions in dangerous atmospheres like chemical plants or manufacturing facilities, by lowering the oxygen level below explosive limits.

Electronics: In the process of assembling electronics, nitrogen gas is used when two electronic components are forming a permanent connection, also known as soldering. The gas is used to reduce surface tension so there is a cleaner break away from the site of the electrical bond. Nitrogen gas is also used in a computer's main processing system to prevent it from overheating.

Laboratory: Laboratories require a very specific environment to ensure that tests and results are carried out accurately. Nitrogen gas is used to control oxygen levels, humidity and temperature, and maintain an appropriate

atmosphere for highly sensitive procedures and equipment. Additionally, there are various pieces of laboratory equipment that require nitrogen for purging.

Laser Cutting: The application of nitrogen as a purging gas in the steel industry is extremely important. It is used as an assist gas to blow away molten material and achieve a stronger stainless or aluminized steel product that is also more resistant to corrosion.

https://nigen.com/industries-that-benefit-from-on-site-nitrogen-systems/

Industries That Benefit from On-Site Nitrogen Systems

Gaseous nitrogen is very useful in large-scale manufacturing and industrial applications. The large volumes of nitrogen gas required for these operations are either sourced from vendors in gas cylinders or generated on-site. In this article, we will highlight critical industrial processes that benefit from on-site nitrogen systems.

Dissolved Oxygen – Measures:

Dissolved oxygen (DO) is oxygen held (dissolved) in the water and available to aquatic organisms.

The amount of dissolved oxygen in a river or stream can tell us a lot about its water quality.

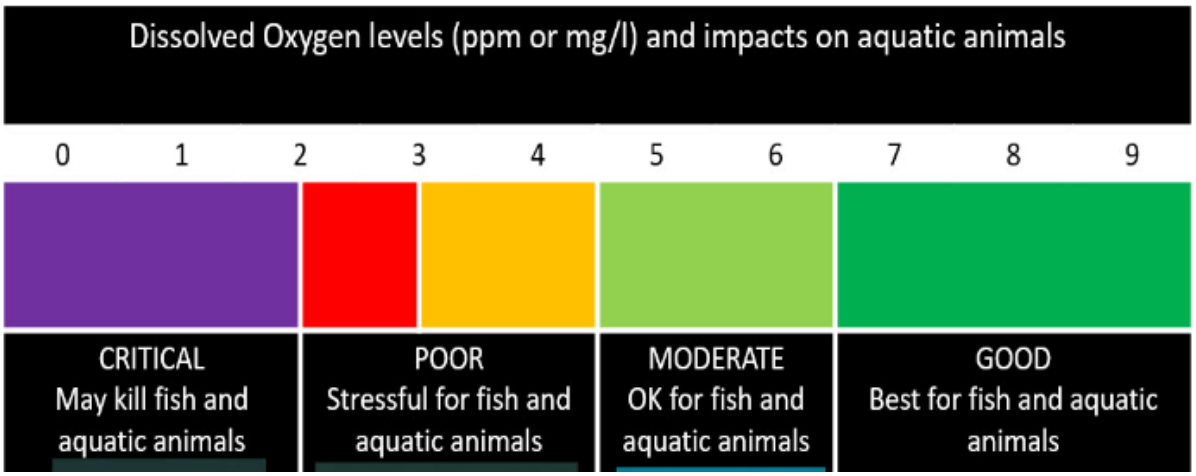
Water will naturally contain a certain amount of dissolved oxygen that is absorbed from the air and produced by plants and algae living in the water.

Temperature has a large effect on the amount of oxygen dissolved in water; cold water can hold higher levels of oxygen than warmer water. Higher water temperatures over summer will cause oxygen levels to drop.

Other factors such as river flow, wind, nutrients and bacterial activity can also affect the amount of dissolved oxygen in waterways.

Dissolved oxygen levels typically range between 5 and 14 mg/L (or ppm).

Example:



Salinity – Measures:

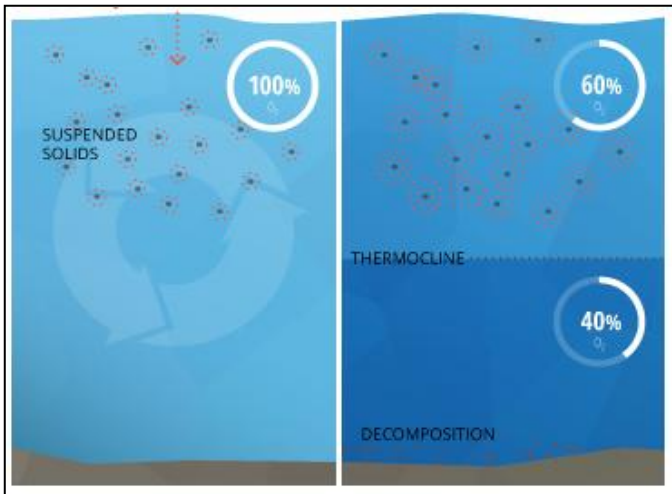
Electrical conductivity is a measure of the saltiness of the water and is measured on a scale from 0 to 50,000 uS/cm. Electrical conductivity is measured in microsiemens per centimeter (uS/cm). Freshwater is usually between 0 and 1,500 uS/cm and typical sea water has a conductivity value of about 50,000 uS/cm.

Examples:

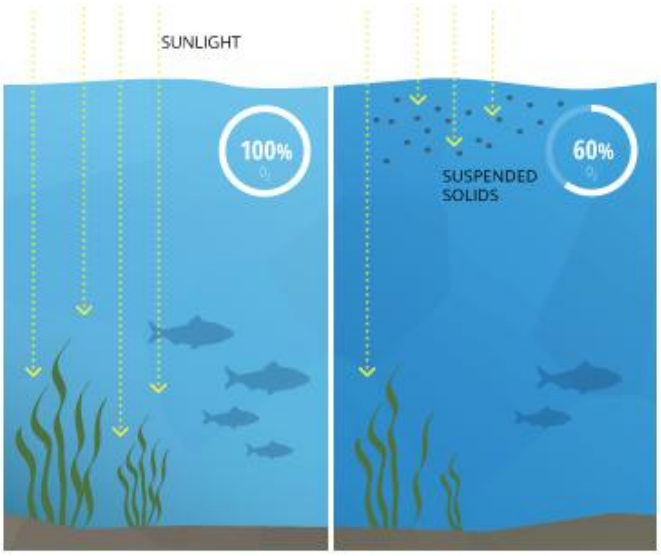
µS/cm	Use
0 - 800	• Good drinking water for humans (provided there is no organic pollution and not too much suspended clay material) • Generally good for irrigation, though above 300µS/cm some care must be, particularly with overhead sprinklers, which may cause leaf, scorch on some salt sensitive plants. • Suitable for all livestock
800 - 2500	• Can be consumed by humans, although most would prefer water in the lower half of this range if available • When used for irrigation, requires special management including suitable soils, good drainage and consideration of salt tolerance of plants • Suitable for all livestock
2500 -10,000	• Not recommended for human consumption, although water up to 3000 µS/cm can be consumed • Not normally suitable for irrigation, although water up to 6000 µS/cm can be used on very salt tolerant crops with very special management techniques. Over 6000 µS/cm, occasional emergency may be possible with care • When used for drinking water by poultry and pigs, the salinity should be limited to about 6000 µS/cm. Most other livestock can use water up to 10000 µS/cm

Total Dissolve Solids (TDS) – Measures

Dissolved solids, smaller than 2 microns, refer to any minerals, salts, metals, in the form of molecules, atoms, cations or anions dissolved in water. Total dissolved solids (TDS) comprise inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulfates) and some small amounts of organic matter that dissolve in water.
The TDS concentration is the sum of all filterable substances in water that can be determined gravimetrically. However, in most cases, TDS is primarily comprised of ions.
High levels of total suspended solids can affect turbidity, increase water temperatures and decrease dissolved oxygen (DO) levels. This can cause the water to heat up more rapidly because the suspended particles absorb more heat and deplete oxygen, which can adversely affect aquatic life.



Suspended solids can increase the temperature of water as they absorb additional heat from the sun. This can also cause dissolved oxygen levels to drop below the thermocline, creating hypoxic conditions.

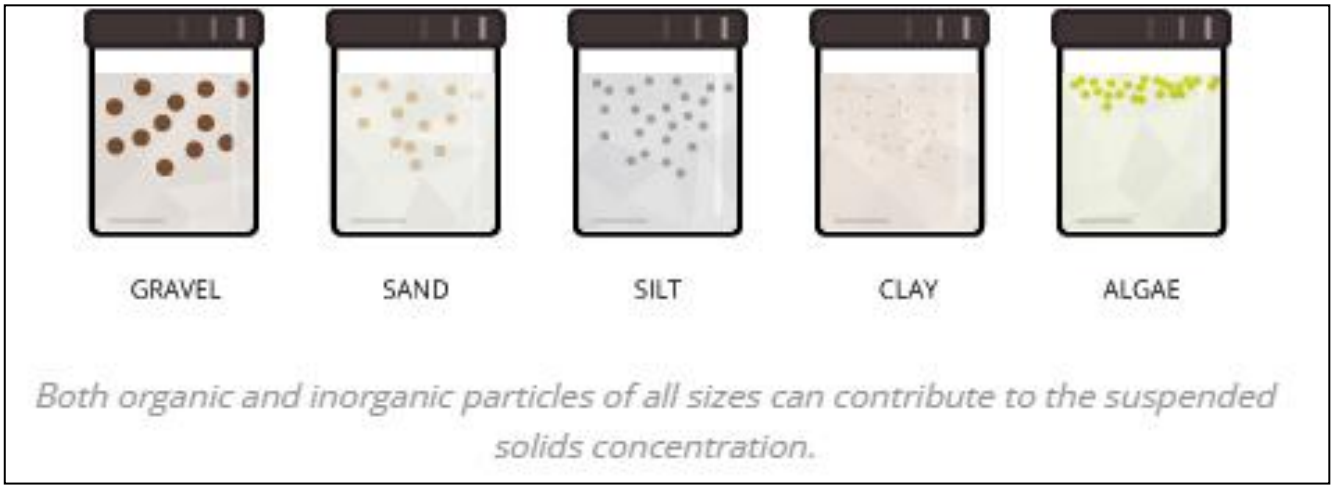


Suspended solids, particularly algae, can block sunlight from reaching submerged plants. This can cause dissolved oxygen levels to drop, as the plants rely on respiration (consuming oxygen) instead of photosynthesis.

Turbidity – Total Suspended Solids (TSS)

Turbidity data are reported in Nephelometric Turbidity Units (NTU). To provide a sense of scale, water with a turbidity of 1 NTU is crystal clear, water at 5 NTU has a tiny trace of discolouration, and water at 100 NTU is brown and opaque. The standard is less than 10 NTU for rural streams and rivers and less than 30 NTU for urban lakes and ponds.

Total suspended solids (TSS) are particles that are larger than 2 microns found in the water column. Anything smaller than 2 microns (average filter size) is considered a dissolved solid. Most suspended solids are made up of inorganic materials, though bacteria and algae can also contribute to the total solids concentration.



Both organic and inorganic particles of all sizes can contribute to the suspended solids concentration.

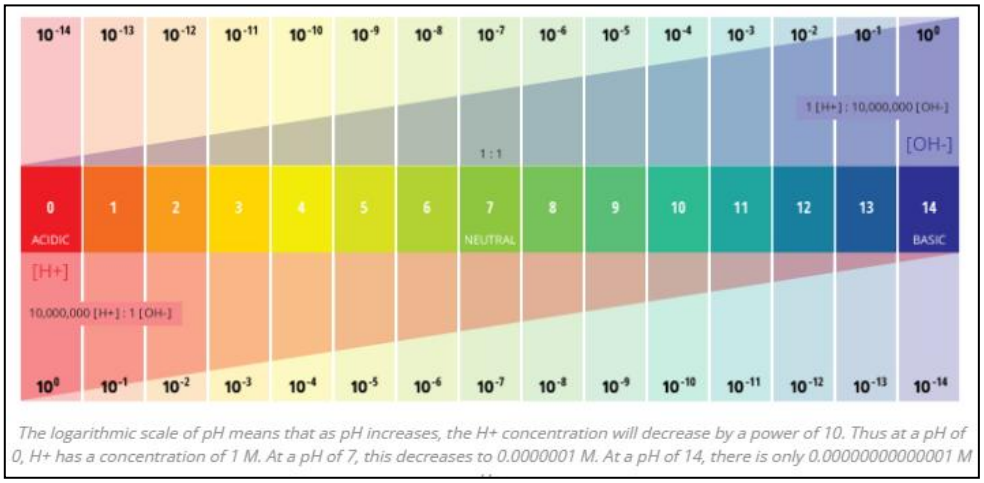
pH – Acidity / Alkalinity – Measures

The pH refers to the degree of acidity or alkalinity of a substance. A pH of 7 is neutral. A value above 7 indicates that the water is more alkaline and a pH below 7 indicates acidic conditions.

A pH of 7 is considered neutral. The logarithmic scale means that each number below 7 is 10 times more acidic than the previous number when counting down. Likewise, when counting up above 7, each number is 10 times more basic than the previous number pH stands for the "power of hydrogen" [3]. The numerical value of pH is determined by the molar concentration of hydrogen ions (H+) [3]. This is done by taking the negative logarithm of the H+ concentration (-log(H+)).

Standard values for pH readings are expected, pH 6.5–9 for rural streams and rivers and pH 6–9 for urban lakes and ponds.

In freshwater systems pH sets up the conditions for how easy it is for nutrients to be available and how easily things like heavy metals (toxicity for aquatic life) can dissolve in the water. Rivers and lakes generally range between 5



The logarithmic scale of pH means that as pH increases, the H+ concentration will decrease by a power of 10. Thus at a pH of 0, H+ has a concentration of 1 M. At a pH of 7, this decreases to 0.0000001 M. At a pH of 14, there is only 0.00000000000001 M

(acidic) and 9 (basic) on the pH scale.

PFAS are per- and polyfluoroalkyl substances, In Australia, the historical use of PFAS in fire-fighting foams has resulted in increased levels being detected at sites like airports, Defence bases, and other sites where fire-fighting training has

been conducted, or where fire suppression systems are installed for extinguishing liquid-fuel fires. Increased environmental levels of PFAS have also been found near some industrial areas, effluent outfalls and landfill sites refer (Australian Government ; What are PFAS? | Australian Government PFAS Taskforce.)

PFAS chemicals can persist in the environment for decades, polluting waterways, soil and air, and build up in the bodies of animals and humans over time.
Two of the best-known types of PFAS are PFOS (perfluorooctane sulfonate), previously used in Scotchgard and firefighting foams, and PFOA (perfluorooctanoic acid), historically used to make Teflon cookware.
Today, both chemicals are recognised internationally as being toxic to humans and wildlife and have been discontinued (or are being progressively phased out) in many countries, including Australia.
Refer (ABC Health News PFAS 'forever chemicals' are all around us. What does it mean for our health? - ABC News)

Bioaccumulation of hydrocarbons in the water table:

Polycyclic aromatic hydrocarbons (PAHs) are a major class of organic contaminants.
PAH causes various toxic effects in living organisms including carcinogenicity.

Polycyclic aromatic hydrocarbons (PAHs) are considered a major class of organic contaminants or pollutants, which are poisonous, mutagenic, genotoxic, and/or carcinogenic. Due to their ubiquitous occurrence and recalcitrance, PAHs-related pollution possesses significant public health and environmental concerns.

- PAHs are primarily released from human activities such as fossil fuel combustion, industrial processes, and oil spills.
- Bioaccumulation: These compounds accumulate in aquatic organisms, including fish and other aquatic species , and can also transfer through the food chain, posing risks to human health.
- Ecological Impact: The bioaccumulation of hydrocarbons disrupts aquatic ecosystems, leading to reduced biodiversity and increased toxicity in affected organisms.

Aquatic ecosystems	
Indicator	Numerical criteria (trigger values)
Total phosphorus 10 µg/L	• Upland rivers: 20 µg/L • Lowland rivers: 25 µg/L for rivers flowing to the coast; • Lakes & reservoirs: 10 µg/L • Estuaries: 30 µg/L
Total nitrogen 400 µg/L	• Upland rivers: 250 µg/L • Lowland rivers: 350 µg/L for rivers flowing to the coast; • Lakes & reservoirs: 350 µg/L • Estuaries: 300µg/L
Chlorophyll-a	• Upland rivers: not applicable • Lowland rivers: 5 µg/L • Lakes & reservoirs: 5 µg/L. • Estuaries: 4 µg/L.
Turbidity 17.53 NTU	• Upland rivers: 2–25 NTU (see supporting information) • Lowland rivers: 6–50 NTU (see supporting information) • Lakes & reservoirs: 1–20 NTU • Estuaries: 0.5–10 NTU
Salinity (electrical conductivity) 590 µS/cm	• Upland rivers: 30–350 µS/cm • Lowland rivers: 125–2200 µS/cm supporting information
Dissolved oxygen 10.19 ppm	• Upland rivers: 90–110% • Lowland rivers: 85–110% • Freshwater lakes & reservoirs: 90–110% • Estuaries: 80–110% Note: Dissolved oxygen values were derived from daytime measurements. Dissolved oxygen concentrations may vary diurnally and with depth. Monitoring programs should assess this potential variability.
pH 8.32	• Upland rivers: 6.5–8.0 • Lowland rivers: 6.5–8.5 • Freshwater lakes & reservoirs: 6.5–8.0 • Estuaries: 7.0–8.5 Changes of more than 0.5 pH units from the natural seasonal maximum or minimum should be investigated.

Map Image 5. Stormwater Testing Site OP-6 – Basin OSD-6 – MPW

Sample Site Map

0 30 60 120 Meters

Client: M.I.D Plumbing	Map Issue: Basin 6 Sample Site Map
Address: BUSHMASTER AVENUE MOOREBANK2170	Time: 10/07/2024 2:24 PM

LGA: LIVERPOOL CITY COUNCIL	Scale: 1:2,000
Lot/DP: 5 to 14/DP 1299137	Spatial Reference: WGS 1984 Web Mercator Auxiliary Sphere
Units: Meters	

Marco Perry
Environmental/Bushfire Planner
Bsc EnvSc

Marco@apical-bushfire.com.au

BASIN 6 (OSD-6) – OUTFLOW

Site image 1. Testing site Basin OSD-6 – Inlet SIOMP Flows

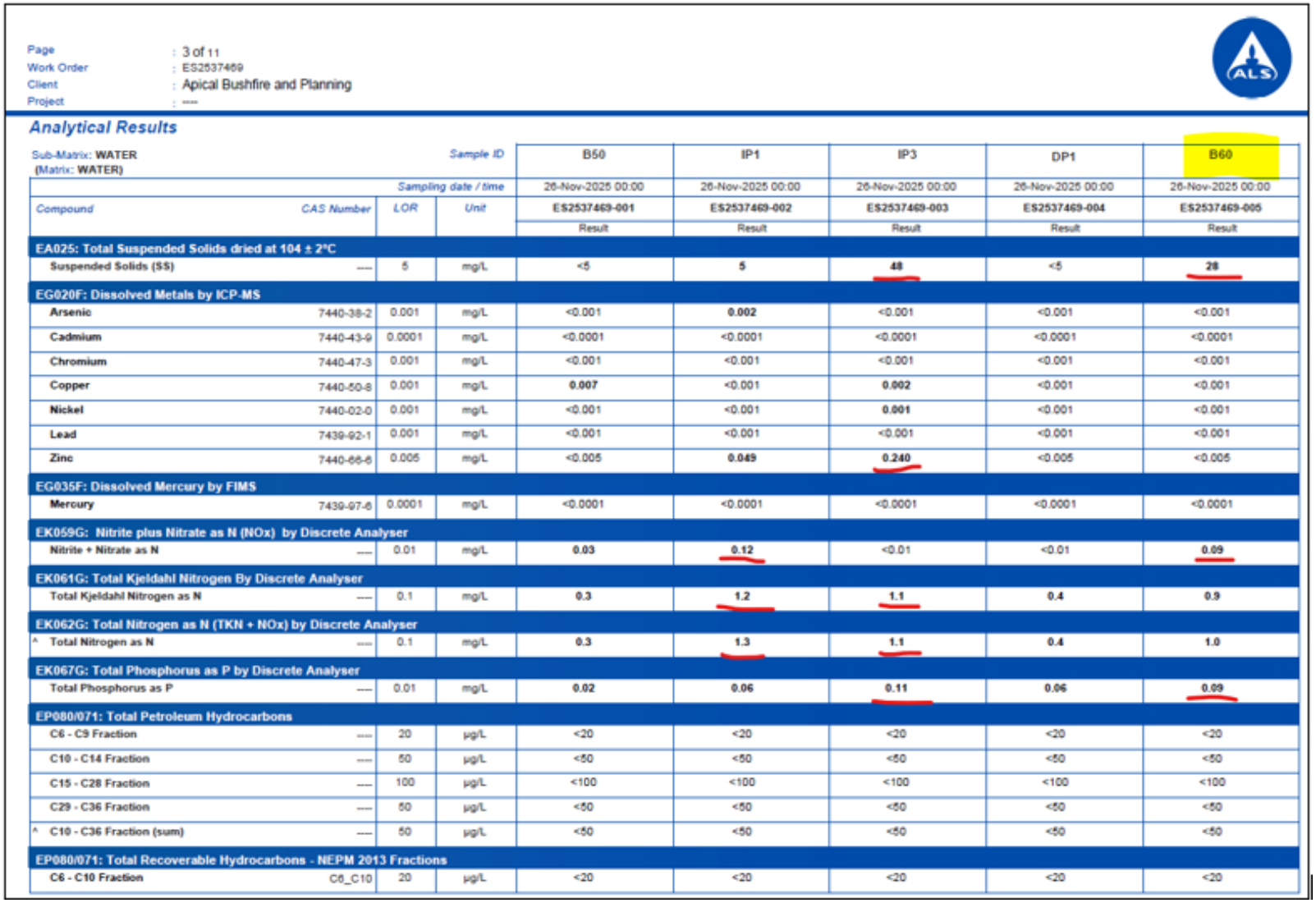
Outflow rock ramp (OSD-6) to Georges River

Water Quality Monitoring Comparative Table (Temporal)

Table 4. Retention Basin 5 MPW. Testing Site MPW 5 Outflow

Testing Site MPW Outflow	May 2024 baseline	October 2024	April 2025	Nov 2025
pH	6.39	6.21	8.32	8.37
Dissolved Oxygen - %/L	4.11mg/L	10.5	10.19	9.5mg/L
Actual Electronic Conductivity	0.054945	0.008	93.5 ORP mV	175.7 ORP mV
Temperature - ℃	18.12	19.5	21.9	21.1
Turbidity	0.03 NTU	6.62	17.53	3.66 NTU
Total phosphorous - mg/L	0.04 mg/L	0.03	<0.01	0.09mg/L
Total nitrogen - mg/L	1.7 mg/L	0.4	0.4	1.0mg/L
Kjeldahl nitrogen mg/L	1.0 mg/L	0.4	0.3	0.9 mg/L
Dissolved metals				
Arsenic	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	<0.001	<0.001	<0.001	<0.001
Copper	0.017	<0.001	0.005	0.001
Nickel	0.001	<0.001	0.001	0.001
Lead	<0.001	<0.001	<0.001	<0.001
Zinc	<0.005	0.008	<0.005	<0.005
Mercury	<0.0001	<0.0001	<0.0001	<0.0001
PFAS				
Lab results – SUM of PFAS Micrograms/L	0.13	0.04	0.08	0.39
SUM of PFHxS & PFOS Microgrms/L	0.04	0.04	0.01	0.33
Total suspended solids mg/L	6	<5	10	28mg/L
Total hydrocarbons				
Benzene	<1	<1	<1	<1
Toluene	<2	<2	<2	<2
Ethylbenzene	<2	<2	<2	<2
meta-& para-Xylene	<2	<2	<2	<2
Ortho-Xylene	<2	<2	<2	<2
Total Xylenes	<2	<2	<2	<2
Sum of BTEX	<1	<1	<1	<1
Naphthalene	<5	<5	<5	<5

Results



Page : 3 of 11
Work Order : ES2537469
Client : Apical Bushfire and Planning
Project : ----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	B50	IP1	IP3	DP1	B60
			Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00
Compound	CAS Number	LOR	Unit	ES2537469-001	ES2537469-002	ES2537469-003	ES2537469-004	ES2537469-005
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	5	48	<5	28
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.007	<0.001	0.002	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	0.049	0.240	<0.005	<0.005
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.12	<0.01	<0.01	0.09
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	1.2	1.1	0.4	0.9
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	0.3	1.3	1.1	0.4	1.0
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.02	0.06	0.11	0.06	0.09
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B50	IP1	IP3	DP1	B60
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00
Compound	CAS Number	LOR	Unit		ES2537469-001	ES2537469-002	ES2537469-003	ES2537469-004	ES2537469-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	**0.04**	**0.03**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	**0.04**	**0.03**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	**0.16**	**0.10**	**0.03**	**0.15**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	**0.08**	**0.03**	**0.02**	**0.18**
Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B50	IP1	IP3	DP1	B60
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00
Compound	CAS Number	LOR	Unit		ES2537469-001	ES2537469-002	ES2537469-003	ES2537469-004	ES2537469-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	**0.04**	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	**0.14**	**0.09**	**0.03**	**0.05**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	**0.03**	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	**0.05**	**0.03**	<0.01	**0.01**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorohexadecanoic acid (PFHxDA)	67905-19-5	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B50	IP1	IP3	DP1	B60
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00
Compound	CAS Number	LOR	Unit		ES2537469-001	ES2537469-002	ES2537469-003	ES2537469-004	ES2537469-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	0.58	0.31	0.08	0.39
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	0.24	0.13	0.05	0.33
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	0.54	0.28	0.08	0.39
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		77.5	80.0	88.1	80.2	117
Toluene-D8	2037-26-5	2	%		100	98.7	102	96.3	98.5
4-Bromofluorobenzene	460-00-4	2	%		112	111	109	100	123
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		87.9	84.6	84.8	86.0	83.1
13C8-PFOA	----	0.02	%		89.5	88.1	87.5	87.9	87.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	B6I	B5I	B8O	B8I	----
			Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	----
Compound	CAS Number	LOR	Unit	ES2537469-006	ES2537469-007	ES2537469-008	ES2537469-009	----
				Result	Result	Result	Result	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	13	199	6	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	<0.001	0.003	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.002	----
Copper	7440-50-8	0.001	mg/L	0.003	<0.001	0.001	0.005	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	0.004	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	0.012	<0.005	0.006	<0.005	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.05	0.12	0.04	0.16	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	1.0	0.6	1.7	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.0	1.1	0.6	1.9	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.09	0.21	0.05	0.04	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B6I	B5I	B8O	B8I	----
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	----
Compound	CAS Number	LOR	Unit		ES2537469-006	ES2537469-007	ES2537469-008	ES2537469-009	----
					Result	Result	Result	Result	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	<0.01	0.03	0.02	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	0.01	0.03	0.03	----
Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B6I	B5I	B8O	B8I	----
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	----
Compound	CAS Number	LOR	Unit		ES2537469-006	ES2537469-007	ES2537469-008	ES2537469-009	--------
					Result	Result	Result	Result	----
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	**0.03**	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	**0.02**	**0.07**	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	**0.01**	**0.01**	**0.03**	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
Perfluorohexadecanoic acid (PFHxDA)	67905-19-5	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	B6I	B5I	B8O	B8I	----
				Sampling date / time	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	26-Nov-2025 00:00	----
Compound	CAS Number	LOR	Unit		ES2537469-006	ES2537469-007	ES2537469-008	ES2537469-009	-------
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	0.02	0.09	0.18	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	0.01	0.06	0.05	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	0.02	0.09	0.18	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		79.7	106	81.4	80.5	----
Toluene-D8	2037-26-5	2	%		100	81.9	98.5	99.2	----
4-Bromofluorobenzene	460-00-4	2	%		113	106	111	104	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		83.2	84.6	83.4	84.7	----
13C8-PFOA	----	0.02	%		86.6	87.2	86.0	85.5	----

Appendix B. ANZECC & ARMCANZ (2000) water quality guidelines

Table 3.4.1 Trigger values for toxicants at alternative levels of protection. Values in grey shading are the trigger values applying to typical *slightly–moderately disturbed systems*; see table 3.4.2 and Section 3.4.2.4 for guidance on applying these levels to different ecosystem conditions.

Chemical		Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
		Level of protection (% species)				Level of protection (% species)			
		99%	95%	90%	80%	99%	95%	90%	80%
METALS & METALLOIDS									
Aluminium	pH >6.5	27	55	80	150	ID	ID	ID	ID
Aluminium	pH <6.5	ID	ID	ID	ID	ID	ID	ID	ID
Antimony		ID	ID	ID	ID	ID	ID	ID	ID
Arsenic (As III)		1	24	94 [C]	360 [C]	ID	ID	ID	ID
Arsenic (AsV)		0.8	13	42	140 [C]	ID	ID	ID	ID
Beryllium		ID	ID	ID	ID	ID	ID	ID	ID
Bismuth		ID	ID	ID	ID	ID	ID	ID	ID
Boron		90	370 [C]	680 [C]	1300 [C]	ID	ID	ID	ID
Cadmium	H	0.06	0.2	0.4	0.8 [C]	0.7 [B]	5.5 [B, C]	14 [B, C]	36 [B, A]
Chromium (Cr III)	H	ID	ID	ID	ID	7.7	27.4	48.6	90.6
Chromium (CrVI)		0.01	1.0 [C]	6 [A]	40 [A]	0.14	4.4	20 [C]	85 [C]
Cobalt		ID	ID	ID	ID	0.005	1	14	150 [C]
Copper	H	1.0	1.4	1.8 [C]	2.5 [C]	0.3	1.3	3 [C]	8 [A]
Gallium		ID	ID	ID	ID	ID	ID	ID	ID
Iron		ID	ID	ID	ID	ID	ID	ID	ID
Lanthanum		ID	ID	ID	ID	ID	ID	ID	ID
Lead	H	1.0	3.4	5.6	9.4 [C]	2.2	4.4	6.6 [C]	12 [C]
Manganese		1200	1900 [C]	2500 [C]	3600 [C]	ID	ID	ID	ID
Mercury (inorganic)	B	0.06	0.6	1.9 [C]	5.4 [A]	0.1	0.4 [C]	0.7 [C]	1.4 [C]
Mercury (methyl)		ID	ID	ID	ID	ID	ID	ID	ID
Molybdenum		ID	ID	ID	ID	ID	ID	ID	ID
Nickel	H	8	11	13	17 [C]	7	70 [C]	200 [A]	560 [A]
Selenium (Total)	B	5	11	18	34	ID	ID	ID	ID
Selenium (SeIV)	B	ID	ID	ID	ID	ID	ID	ID	ID
Silver		0.02	0.05	0.1	0.2 [C]	0.8	1.4	1.8	2.6 [C]
Thallium		ID	ID	ID	ID	ID	ID	ID	ID
Tin (inorganic, SnIV)		ID	ID	ID	ID	ID	ID	ID	ID
Tributyltin (as µg/L Sn)		ID	ID	ID	ID	0.0004	0.006 [C]	0.02 [C]	0.05 [C]
Uranium		ID	ID	ID	ID	ID	ID	ID	ID
Vanadium		ID	ID	ID	ID	50	100	160	280
Zinc	H	2.4	8.0 [C]	15 [C]	31 [C]	7	15 [C]	23 [C]	43 [C]
NON-METALLIC INORGANICS									
Ammonia	D	320	900 [C]	1430 [C]	2300 [A]	500	910	1200	1700
Chlorine	E	0.4	3	6 [A]	13 [A]	ID	ID	ID	ID
Cyanide	F	4	7	11	18	2	4	7	14
Nitrate	J	17	700	3400 [C]	17000 [A]	ID	ID	ID	ID
Hydrogen sulfide	G	0.5	1.0	1.5	2.6	ID	ID	ID	ID
ORGANIC ALCOHOLS									
Ethanol		400	1400	2400 [C]	4000 [C]	ID	ID	ID	ID
Ethylene glycol		ID	ID	ID	ID	ID	ID	ID	ID
Isopropyl alcohol		ID	ID	ID	ID	ID	ID	ID	ID
CHLORINATED ALKANES									
Chloromethanes									
Dichloromethane		ID	ID	ID	ID	ID	ID	ID	ID
Chloroform		ID	ID	ID	ID	ID	ID	ID	ID
Carbon tetrachloride		ID	ID	ID	ID	ID	ID	ID	ID
Chloroethanes									
1,2-dichloroethane		ID	ID	ID	ID	ID	ID	ID	ID
1,1,1-trichloroethane		ID	ID	ID	ID	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
1,1,2-trichloroethane	5400	6500	7300	8400	140	1900	5800 [C]	18000 [C]
1,1,2,2-tetrachloroethane	ID	ID	ID	ID	ID	ID	ID	ID
Pentachloroethane	ID	ID	ID	ID	ID	ID	ID	ID
Hexachloroethane B	290	360	420	500	ID	ID	ID	ID
Chloropropanes								
1,1-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
1,2-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloropropane	ID	ID	ID	ID	ID	ID	ID	ID
CHLORINATED ALKENES								
Chloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1-dichloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1,2-trichloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
1,1,2,2-tetrachloroethylene	ID	ID	ID	ID	ID	ID	ID	ID
3-chloropropene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloropropene	ID	ID	ID	ID	ID	ID	ID	ID
ANILINES								
Aniline	8	250 [A]	1100 [A]	4800 [A]	ID	ID	ID	ID
2,4-dichloroaniline	0.6	7	20	60 [C]	ID	ID	ID	ID
2,5-dichloroaniline	ID	ID	ID	ID	ID	ID	ID	ID
3,4-dichloroaniline	1.3	3	6 [C]	13 [C]	85	150	190	260
3,5-dichloroaniline	ID	ID	ID	ID	ID	ID	ID	ID
Benzidine	ID	ID	ID	ID	ID	ID	ID	ID
Dichlorobenzidine	ID	ID	ID	ID	ID	ID	ID	ID
AROMATIC HYDROCARBONS								
Benzene	600	950	1300	2000	500 [C]	700 [C]	900 [C]	1300 [C]
Toluene	ID	ID	ID	ID	ID	ID	ID	ID
Ethylbenzene	ID	ID	ID	ID	ID	ID	ID	ID
o-xylene	200	350	470	640	ID	ID	ID	ID
m-xylene	ID	ID	ID	ID	ID	ID	ID	ID
p-xylene	140	200	250	340	ID	ID	ID	ID
m+*p*-xylene	ID	ID	ID	ID	ID	ID	ID	ID
Cumene	ID	ID	ID	ID	ID	ID	ID	ID
Polycyclic Aromatic Hydrocarbons								
Naphthalene	2.5	16	37	85	50 [C]	70 [C]	90 [C]	120 [C]
Anthracene B	ID	ID	ID	ID	ID	ID	ID	ID
Phenanthrene B	ID	ID	ID	ID	ID	ID	ID	ID
Fluoranthene B	ID	ID	ID	ID	ID	ID	ID	ID
Benzo(a)pyrene B	ID	ID	ID	ID	ID	ID	ID	ID
Nitrobenzenes								
Nitrobenzene	230	550	820	1300	ID	ID	ID	ID
1,2-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,4-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3,5-trinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-methoxy-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-methoxy-4-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-3-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-4-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1-chloro-2,4-dinitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,2-dichloro-3-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,3-dichloro-5-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
1,4-dichloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID
2,4-dichloro-2-nitrobenzene	ID	ID	ID	ID	ID	ID	ID	ID

Chemical	Trigger values for freshwater (µgL^{-1})				Trigger values for marine water (µgL^{-1})			
	Level of protection (% species)				Level of protection (% species)			
	99%	95%	90%	80%	99%	95%	90%	80%
Hexazinone	ID	ID	ID	ID	ID	ID	ID	ID
Simazine	0.2	3.2	11	35	ID	ID	ID	ID
Urea herbicides								
Diuron	ID	ID	ID	ID	ID	ID	ID	ID
Tebuthiuron	0.02	2.2	20	160 [C]	ID	ID	ID	ID
Miscellaneous herbicides								
Acrolein	ID	ID	ID	ID	ID	ID	ID	ID
Bromacil	ID	ID	ID	ID	ID	ID	ID	ID
Glyphosate	370	1200	2000	3600 [A]	ID	ID	ID	ID
Imazethapyr	ID	ID	ID	ID	ID	ID	ID	ID
Ioxynil	ID	ID	ID	ID	ID	ID	ID	ID
Metolachlor	ID	ID	ID	ID	ID	ID	ID	ID
Sethoxydim	ID	ID	ID	ID	ID	ID	ID	ID
Trifluralin B	2.6	4.4	6	9 [A]	ID	ID	ID	ID
GENERIC GROUPS OF CHEMICALS								
Surfactants								
Linear alkylbenzene sulfonates (LAS)	65	280	520 [C]	1000 [C]	ID	ID	ID	ID
Alcohol ethoxyolated sulfate (AES)	340	650	850 [C]	1100 [C]	ID	ID	ID	ID
Alcohol ethoxylated surfactants (AE)	50	140	220	360 [C]	ID	ID	ID	ID
Oils & Petroleum Hydrocarbons	ID	ID	ID	ID	ID	ID	ID	ID
Oil Spill Dispersants								
BP 1100X	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 7664	ID	ID	ID	ID	ID	ID	ID	ID
Corexit 8667		ID	ID	ID	ID	ID	ID	ID
Corexit 9527	ID	ID	ID	ID	230	1100	2200	4400 [A]
Corexit 9550	ID	ID	ID	ID	ID	ID	ID	ID

Notes: Where the final water quality guideline to be applied to a site is below current analytical practical quantitation limits, see Section 3.4.3.3 for guidance.

Most trigger values listed here for metals and metalloids are *High reliability* figures, derived from field or chronic NOEC data (see 3.4.2.3 for reference to Volume 2). The exceptions are *Moderate reliability* for freshwater aluminium (pH >6.5), manganese and marine chromium (III).

Most trigger values listed here for non-metallic inorganics and organic chemicals are *Moderate reliability* figures, derived from acute LC_{50} data (see 3.4.2.3 for reference to Volume 2). The exceptions are *High reliability* for freshwater ammonia, 3,4-DCA, endosulfan, chlorpyrifos, esfenvalerate, tebuthiuron, three surfactants and marine for 1,1,2-TCE and chlorpyrifos.

* = *High reliability* figure for esfenvalerate derived from mesocosm NOEC data (no alternative protection levels available).

A = Figure may not protect key test species from acute toxicity (and chronic) — check Section 8.3.7 for spread of data and its significance. 'A' indicates that trigger value > acute toxicity figure; note that trigger value should be <1/3 of acute figure (Section 8.3.4.4).

B = Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered (see Sections 8.3.3.4 and 8.3.5.7).

C = Figure may not protect key test species from chronic toxicity (this refers to experimental chronic figures or geometric mean for species) — check Section 8.3.7 for spread of data and its significance. Where grey shading and 'C' coincide, refer to text in Section 8.3.7.

D = Ammonia as TOTAL ammonia as [NH_3-N] at pH 8. For changes in trigger value with pH refer to Section 8.3.7.2.

E = Chlorine as total chlorine, as [Cl]; see Section 8.3.7.2.

F = Cyanide as un-ionised HCN, measured as [CN]; see Section 8.3.7.2.

G = Sulfide as un-ionised H_2S, measured as [S]; see Section 8.3.7.2.

H = Chemicals for which algorithms have been provided in table 3.4.3 to account for the effects of hardness. The values have been calculated using a hardness of 30 mg/L $CaCO_3$. These should be adjusted to the site-specific hardness (see Section 3.4.3).

J = Figures protect against toxicity and do not relate to eutrophication issues. Refer to Section 3.3 if eutrophication is the issue of concern.

ID = Insufficient data to derive a reliable trigger value. Users advised to check if a low reliability value or an ECL is given in Section 8.3.7.

T = Tainting or flavour impairment of fish flesh may possibly occur at concentrations below the trigger value. See Sections 4.4.5.3/3 and 8.3.7.

Table 5. Ecological water quality guideline values developed by water regulators

Exposure scenario	PFOS	PFOA	Exposure scenario	Comments and source
Freshwater	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	Australian and New Zealand Guidelines for Fresh and Marine Water Quality - technical draft default guideline values for PFOS and PFOA. Note 1: The 99% species protection level for PFOS is close to the level of detection. Agencies may wish to apply a 'detect' threshold in such circumstances rather than a quantified measurement. Note 2: The draft guidelines do not account for effects which result from the biomagnification of toxicants in air-breathing animals or in animals which prey on aquatic organisms. Note 3: The WQGs advise [41] that the 99% level of protection be used for slightly to moderately disturbed systems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. Regulators may specify or environmental legislation may prescribe the level of species protection required, rather than allowing for case-by-case assessments.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	
Interim marine	0.00023 µg/L	19 µg/L	99% species protection - high conservation value systems	As above. Freshwater values are to be used on an interim basis until final marine guideline values can be set using the nationally-agreed process under the Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Note 1: The WQG advise that in the case of estuaries, the most stringent of freshwater and marine criteria apply, taking account of any available salinity correction. Note 2: Marine guideline values developed by CRC CARE are under consideration through the nationally-agreed water quality guideline development process.
	0.13 µg/L	220 µg/L	95% species protection - slightly to moderately disturbed systems	
	2 µg/L	632 µg/L	90% species protection - highly disturbed systems	
	31 µg/L	1824 µg/L	80% species protection - highly disturbed systems	

Type of indicator	Indicator	Units	Fresh waters	Marine waters
	Dissolved oxygen[2]	mg/L	> 6 (> 80–90% saturation)	> 6 (> 80–90% saturation)
	Nutrients/nuisance growths	–	(Section 2.3.3)	(Section 2.3.3)
	pH	–	6.5–9.0	< 0.2 pH unit change
	Salinity	mg/L	< 1000 (about 1,500 µS/cm)	–
	Suspended particulate matter/turbidity	–	< 10% change seasonal mean concentration (see also colour & clarity)	< 10% change seasonal mean concentration (see also colour & clarity)
	Temperature[3]	–	< 2°C increase	< 2°C increase
Toxicants				
Inorganic toxicants	Aluminium	µg/L	< 5.0 (if pH < = 6.5)	NR
	Aluminium	µg/L	< 100.0 (if pH > 6.5)	–
	Ammonia	µg/L	20.0–30.0 (Table 2.3)	NR
	Antimony	µg/L	30.0	500.0
	Arsenic	µg/L	50.0	50.0
	Beryllium	µg/L	4.0[4]	NR
	Cadmium	µg/L	0.2–2.0[5]	2.0
	Chromium	µg/L	10.0	50.0
	Copper	µg/L	2.0–5.0[5]	5.0
	Cyanide	µg/L	5.0	5.0
	Iron	µg/L	1,000.0[6]	NR
	Lead	µg/L	1.0–5.0[5]	5.0
	Mercury	µg/L	0.1	0.1
	Nickel	µg/L	15.0–150.0[5]	15.0
	Selenium	µg/L	5.0	70.0
	Silver	µg/L	0.1	1.0
	Sulfide	µg/L	2.0	2.0
	Thallium	µg/L	4.0	20.0
	Tin (tributyltin)	µg/L	0.008	0.002
	Zinc	µg/L	5.0–50.0[6]	50.0
Organic toxicants	Acrylonitrile	µg/L	NR	NR
	Benzidine	µg/L	NR	NR
	Dichlorobenzidine	µg/L	NR	NR
	Diphenylhydrazine	µg/L	NR	NR
Halogenated aliphatic compounds	Hexachlorobutadiene	µg/L	0.1	0.3
	Halogenated ethers	µg/L	NR	NR
	Isophorone	µg/L	NR	NR
Monocyclic aromatic compounds	Benzene	µg/L	300.0	300.0
	Chlorinated benzenes	µg/L	(Table 2.8)	NR

https://www.waterquality.gov.au/sites/default/files/documents/ANZECC-1992-guidelines.pdf

Appendix C. Intensity Frequency Duration – Average Recurrence Interval Indicator
Intensity-Frequency-Duration (bom.gov.au)